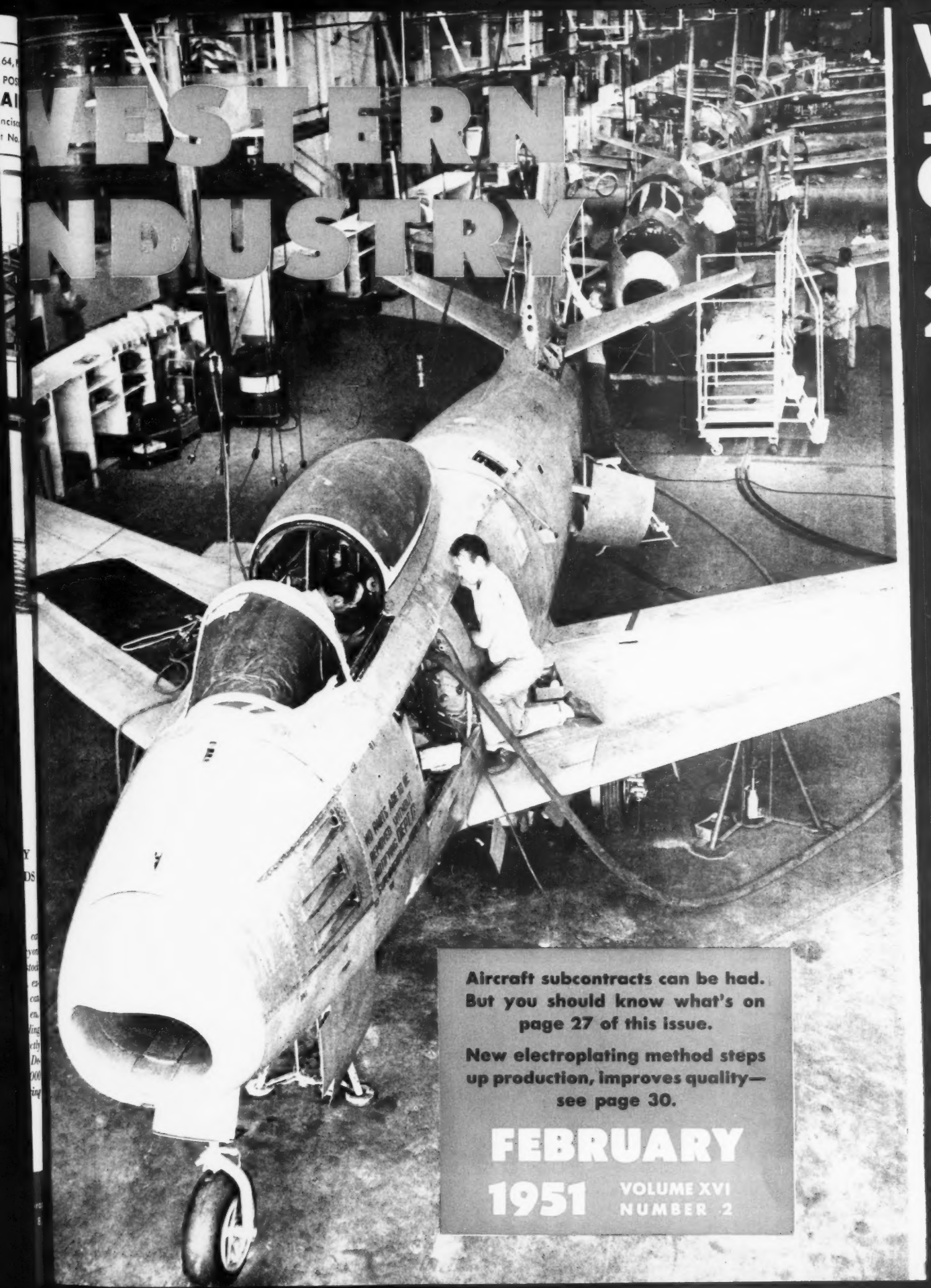

WESTERN INDUSTRY

Aircraft subcontracts can be had. But you should know what's on page 27 of this issue.

New electroplating method steps up production, improves quality—see page 30.

FEBRUARY 1951

VOLUME XVI
NUMBER 2

There's more to a Wirebound box than wood, wire and price!

Experience, manufacturing facilities and container know-how result in sound engineering, prompt service, dependability. Cabco has been manufacturing wooden containers since 1883. Facilities embrace every operation from logging to the finished wirebound. Cabco is the West's recognized leader in designing, developing and supplying wooden shipping containers.

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Cabco engineers designed a sturdy wirebound that reduced container weight to under 20 pounds, yet snugly, securely contained over 400 pounds of firebrick. The new wirebound also saved on labor costs, since it proved much easier and faster to load, handle and palletize. In addition, there was a saving in storage space.

Perhaps there is a new use for light, strong Cabco wirebounds in your business.

Cabco wirebounds fold up quickly, easily, ready for immediate use on the packing line.

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Spinning . . . . . 16 minutes	Tube & Shape Bending . . . . 13 min.
Drawing, Stretching, Stamping . . . . . 22 min.	Brazing . . . . . 7 min.
Blanking & Piercing . . 15 min.	Riveting . . . . . 26 min.
Resistance Welding . . 12 min.	Fabricating Processes . 20 min.
Arc Welding . . . . . 10 min.	Sheet Metal Practice . 20 min.
Torch Welding . . . . 17 min.	Machining . . . . . 32 min.

BOOKLETS

Forming . . . . . 64 pages	Machining Alcoa Aluminum & Its Alloys . 66 pp.
Welding & Brazing . 130 pp.	Alcoa Aluminum in Automatic Screw Machines . . . . 95 pp.
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WESTERN INDUSTRY

VOLUME XVI **FEBRUARY · 1951** NUMBER 2

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Unexpected Opportunities

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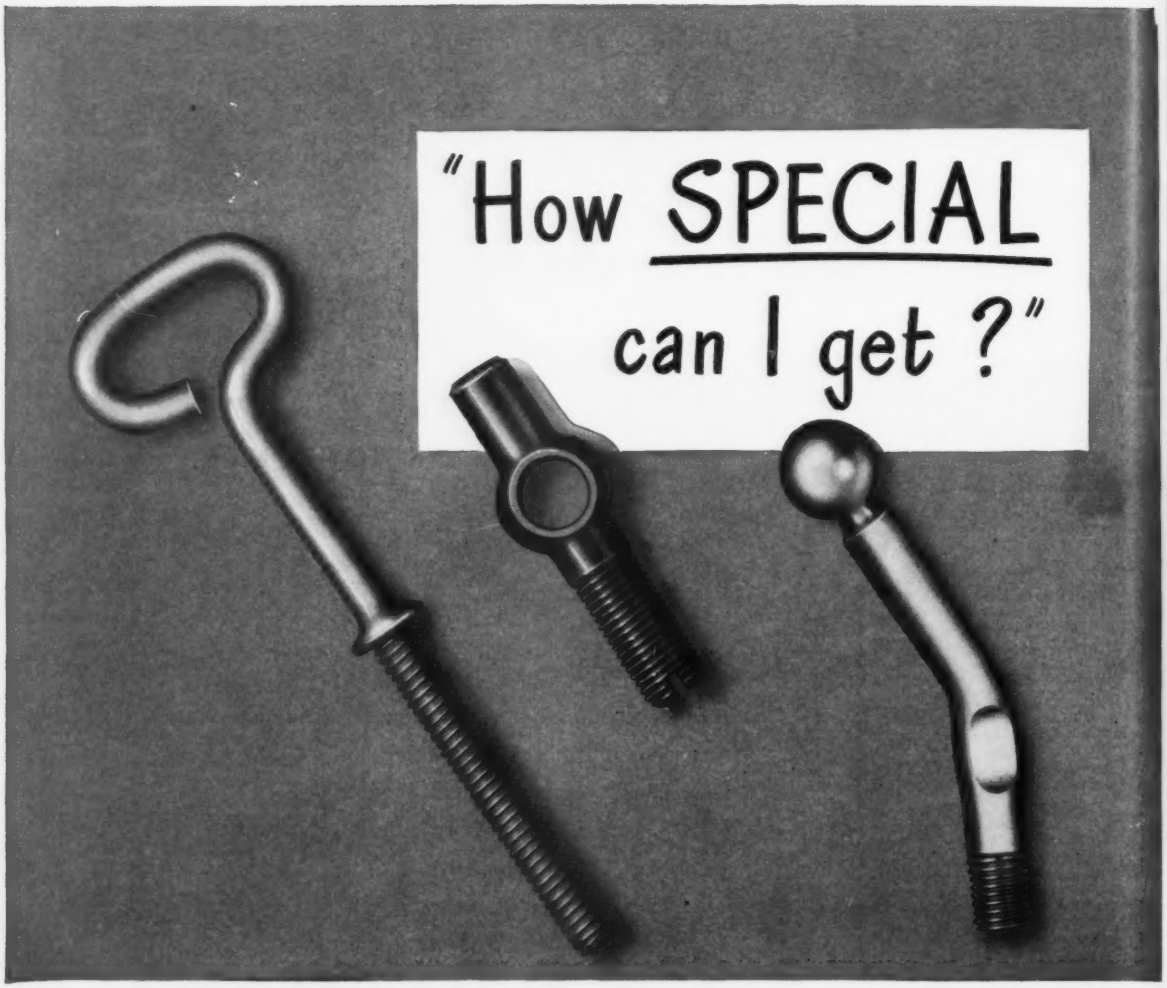
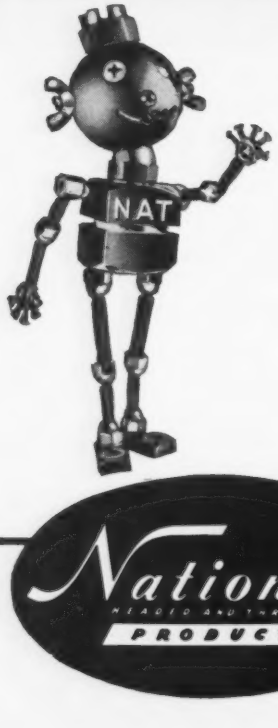
Front Cover

Aircraft is anchored in the West, because favorable operating conditions made it a logical manufacturing center, with the greatest concentration of plants in the Southern California area. Shown here is a final assembly scene at North American Aviation, Inc., at Inglewood, California.





Nat says: "Our engineers can help you find a solution for practically any special fastening problem . . . requiring an unusual type of bolt, nut, screw, pin or headed or threaded part. And with National's wider range of cold heading equipment and specialized machinery, you'll find we're well set to produce for you economically."

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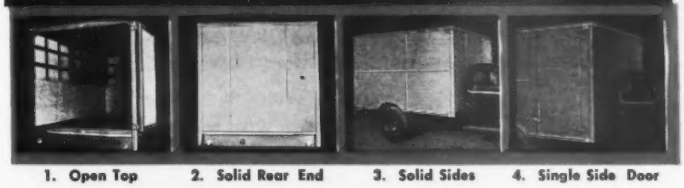
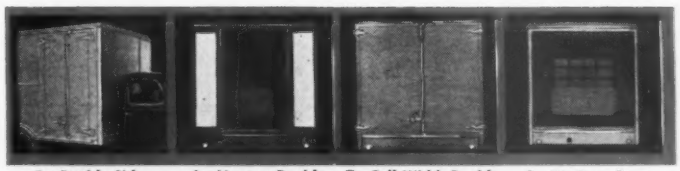
Only Fruehauf *"Unit-Built"* Bodies Offer All These Options . . .



1. Open Top
2. Solid Rear End
3. Solid Sides
4. Single Side Door



5. Double Side Door
6. Narrow Double Rear Doors
7. Full-Width Double Rear Doors
8. No Rear Door

9. Express Gate Rear
10. Tailgate (Outside Type)
11. Tailgate (Flush Type)
12. Tailgate (Doors Above)

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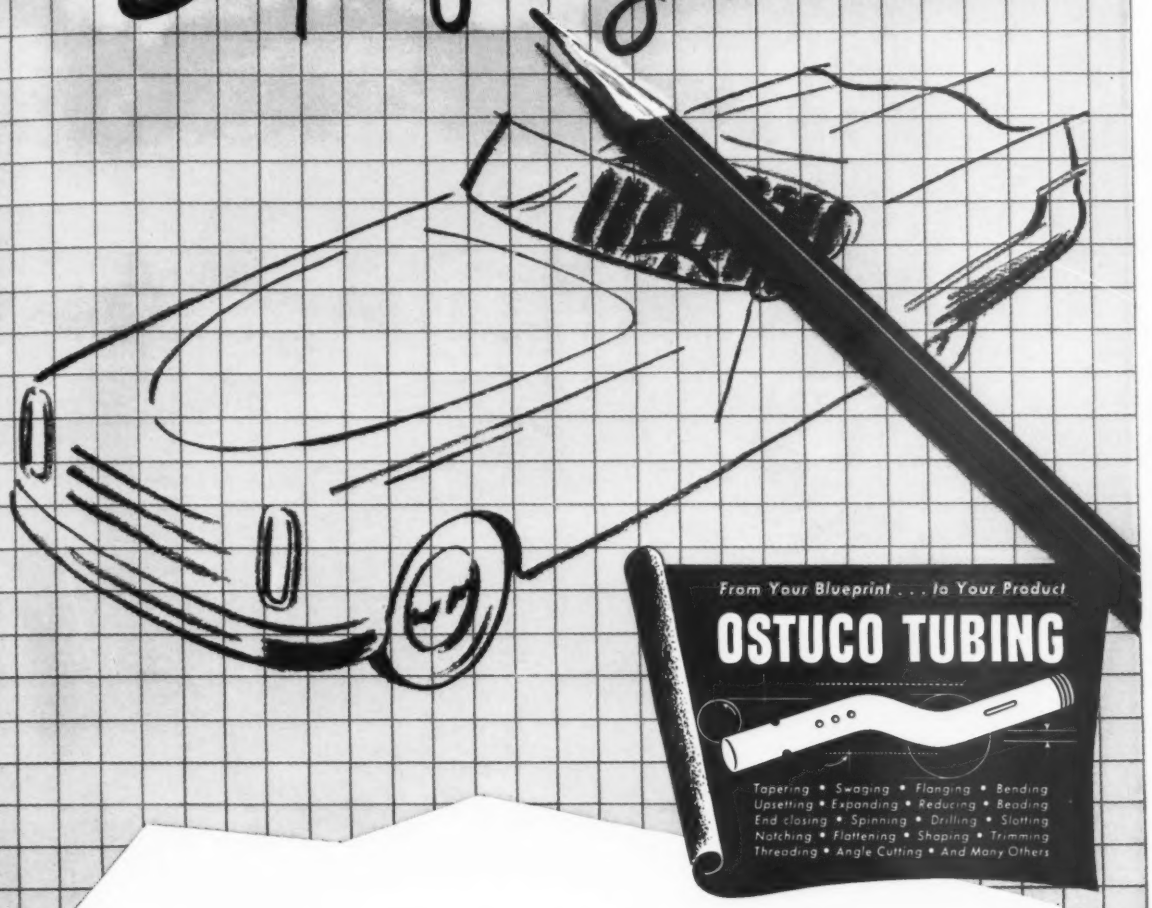

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Because of the growing needs of our armed forces, we cannot promise early delivery on new civilian orders, but we do wish to help you take advantage of OSTUCO Tubing in your plans for the future. Please feel free to call on our experienced tubing engineers for advice and information at any time.

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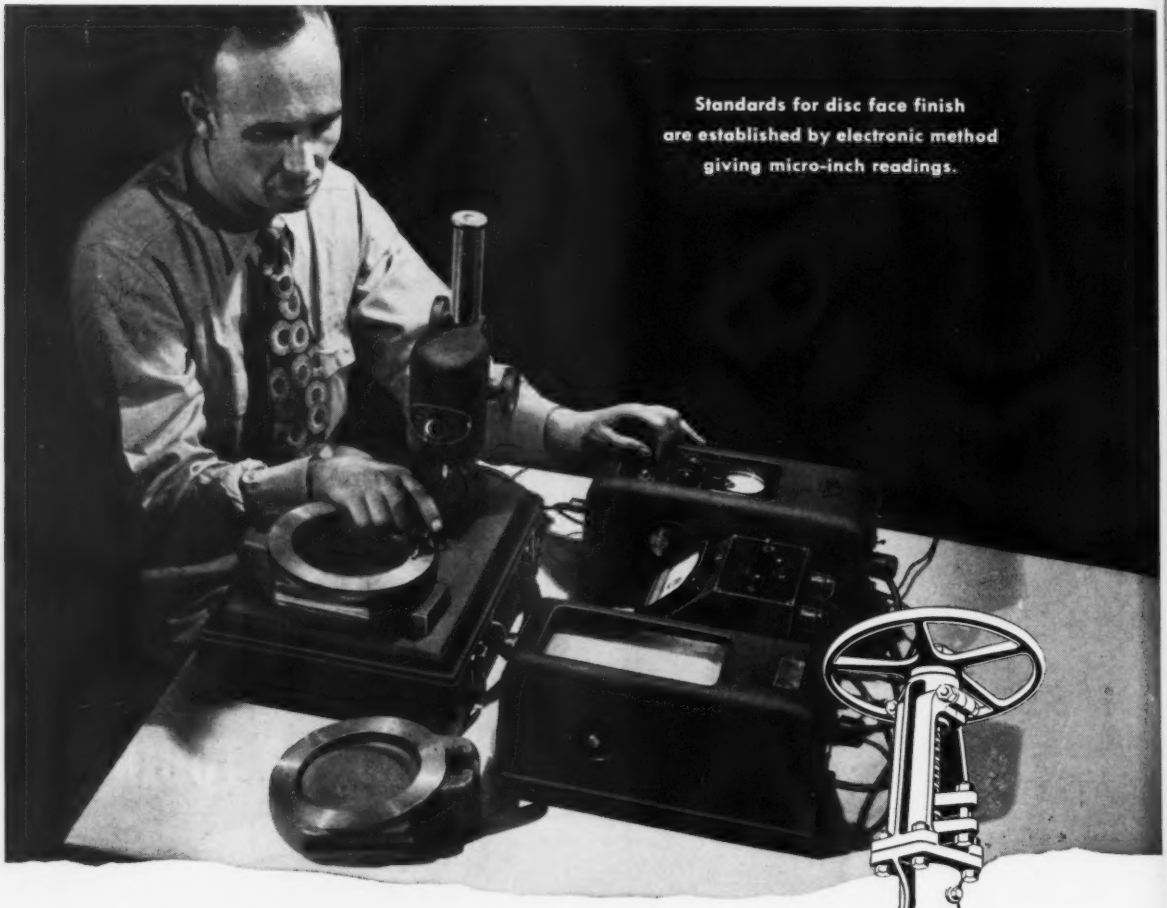
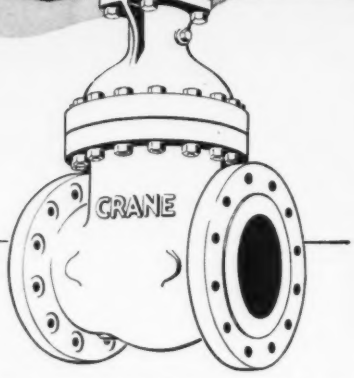


How CRANE controls quality to the Micro-Inch to cut your valve costs

Surface finish of a valve's working parts has a lot to do with its wear resistance and operating efficiency. A correct finish means a tighter-seating valve, easier operation, greater ease of maintenance. In Crane Quality valves, the surface finish of machined parts is measured and controlled to rigid limits. The standards for quality control of surface finish are determined by the most scientific methods as shown above. Yes, nothing is overlooked to make Crane Valves the lowest-cost valves in the long run. *That's Crane Quality!*



Precise quality control of materials, design, and manufacturing—to the highest degree in the industry—makes Crane valves the lowest cost valves in the long run. On steam service, oil and oil vapor lines, for example, you'll find Crane Steel Gate Valves a sure remedy for high maintenance costs. Talk it over with your Crane Representative.

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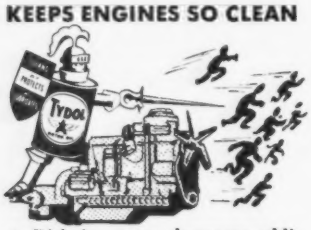
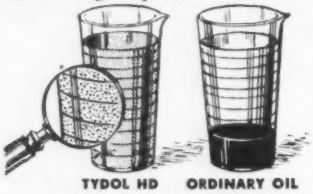
HERE'S ROAD-TEST PROOF! After 31,000 miles of rugged light truck duty, the piston at left—lubricated with engine-cleaning Tydol HD—is free from sludge, varnish, carbon and corrosion. The badly-fouled piston at right—lubricated with a well-known competitive oil—was tested under identical conditions.

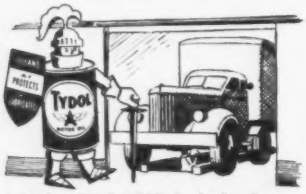
HERE'S WHY TYDOL HD KEEPS ENGINES SO CLEAN



1. Rich in potent detergent additives, Tydol HD quickly loosens sludge (gum, varnish, carbon) from moving parts . . . actively disperses these foreign deposits.



2. Tydol HD holds sludge particles harmlessly in suspension where they cannot cause wear. With ordinary oils, sludge settles onto valves and pistons; soon hardens.



3. When Tydol HD is drained, out goes sludge, too . . . because it's suspended in the oil. Valves, pistons and rings stay free and clean because Tydol HD gets rid of sludge that other oils can't budge.

TYDOL HD DRIVES ENGINE SLUDGE OUT

Cuts Repair Costs!

Power goes up . . . repair costs go down when you safeguard your engines with Heavy Duty Tydols. These amazing HD oils *keep engines cleaner* than any other oil; protect better against wear! Try them. See for yourself how every quart . . . every drop *cleans* as it *protects* as it *lubricates;* gets *three* jobs done—*not* just one!

3 GREAT TYDOLS TO CHOOSE FROM

TYDOL HD—Heavy Duty oil for high-speed gasoline, butane, diesel-fueled engines in automobiles, busses, trucks, tractors and stationary units under normal conditions. SAE grades 10, 20, 30, 40, 50. Sold in cans and drums.

TYDOL HD S-1—Higher detergency level than Tydol HD. For every type of engine subjected to frequent and continued over-loading. For engines in delivery service making many stops and starts. SAE grades 20, 30, 40. In drums.

TYDOL HD S-2—Highest detergency level of the HD series. For high performance super-charged engines using all types of diesel fuels, under the most extreme operating conditions. SAE grade 30. Sold in drums.

Rely on your Associated Representative for expert help on any lubrication problem.

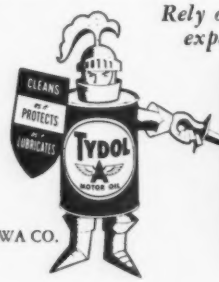


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figure on aluminum and you'll figure low

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of ALCOA EC ALUMINUM are made by leading manufacturers

RAW ORE TO FINISHED PRODUCT

– faster, cheaper –

WITH G. P. LUBRICATION

THE DANTORE DIVISION of Dant & Russell, Inc., manufactures acoustical tile and light weight plaster aggregates from a volcanic glass known as perlite. Their procedure is unique, combining processing and manufacturing into one production operation. Raw ore is crushed, screened and fed into two 3200 degree rotary "popping" furnaces where it is exploded into the minute glass balls which form the basis for the unusually light aggregate trade named "Dantore."

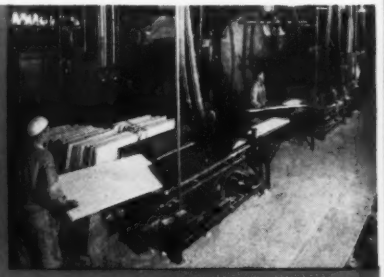
The crusher, rod mill, and furnaces operate on a continual production line schedule. Highly abrasive dust resulting from these operations plus continuous high temperature create unusually difficult lubrication problems.

To overcome these problems, General Petroleum Lube Engineers conducted a thorough analysis of each machine's needs and prepared a list of recommended lubricants and lubrication procedures.

According to Paul Schmidt, plant superintendent, these recommendations "have increased production appreciably by keeping repairs and down time to a minimum."

RAW PERLITE ORE being crushed as first step in process of producing Dantore light weight products for plaster, concrete and acoustical tile.

PAUL SCHMIDT, plant superintendent in foreground examines trunnions and drive gear of rotary popping furnace, while Robert Hays, G. P. Industrial Salesman and Shirley Schwab, plant foreman, look on.



BEARING TEMPERATURES in high speed kerfing, beveling and sawing machines finishing acoustical tile are substantially reduced by use of Gargoyle Grease BRB #3.

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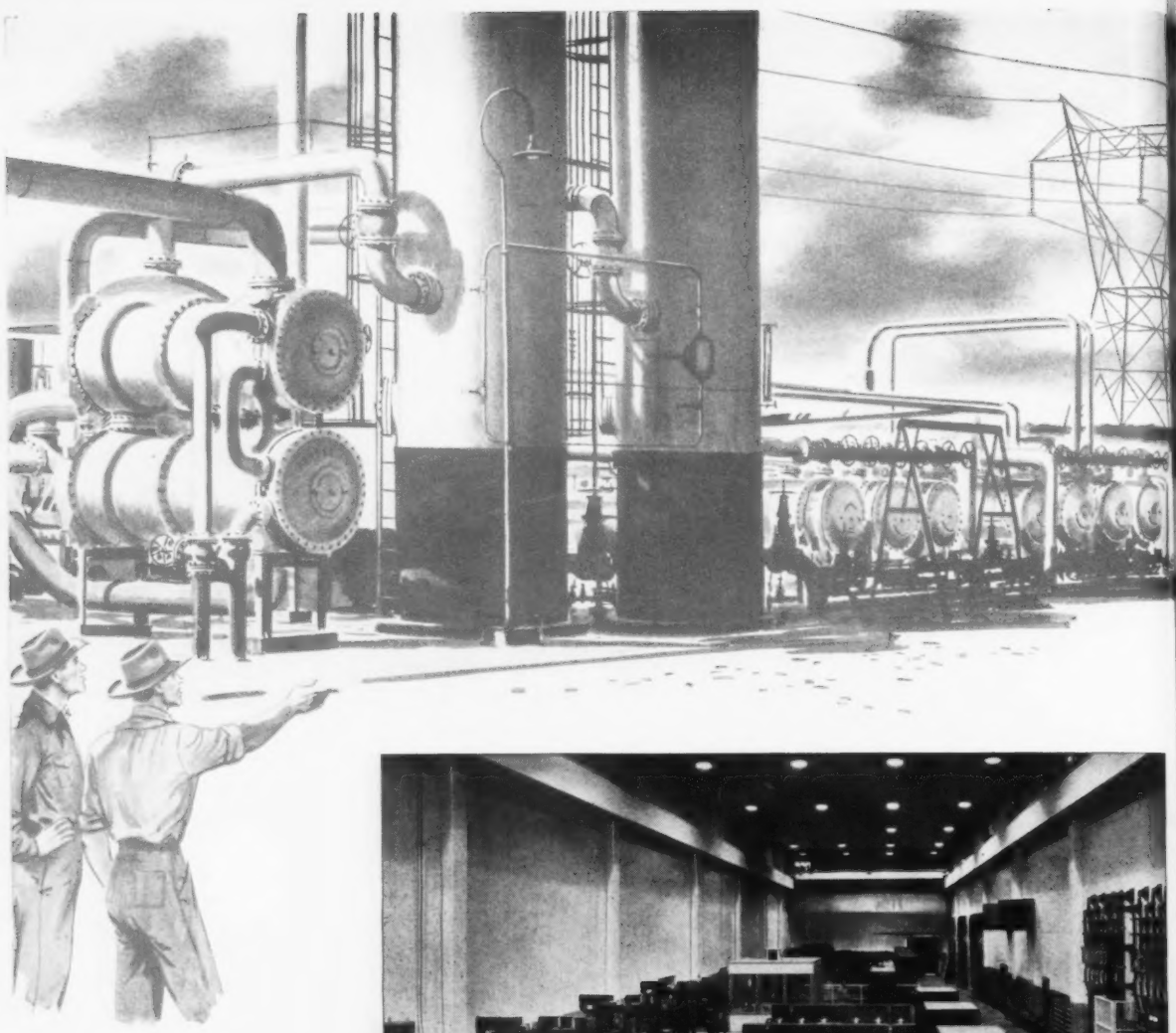


Westinghouse Ignitrons—low-cost d-c power for Western Electrochemical Company's plant at Henderson, Nevada.

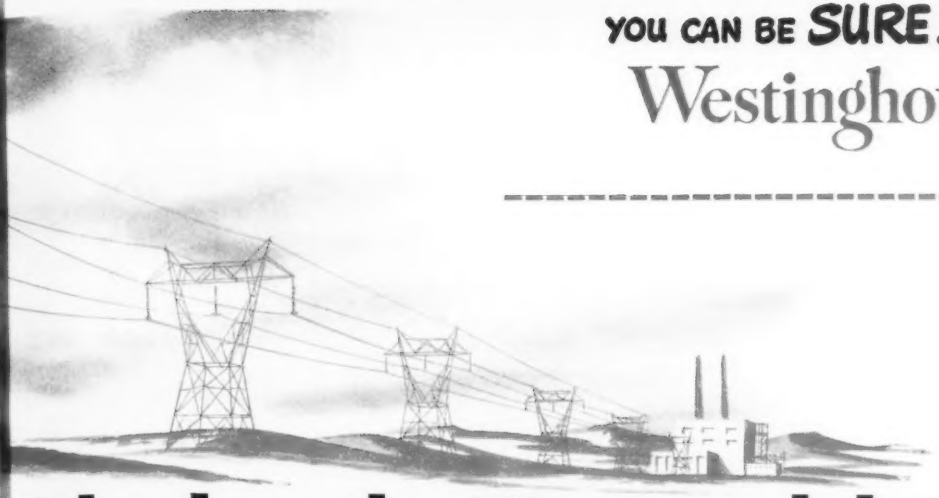
CHEMICALS IN THE WEST...MORE PLANTS, WORKERS, OUTPUT

Fast grower and big power user is the Western chemical industry. Since 1939 its productive value has zoomed 274%. The labor force has doubled. More than 300 new plants have been built.

Topnotch electrical equipment helps the industry get the most out of power, helps it grow. Take a prime Westinghouse development like Ignitron rectifiers shown above. Those big cylinders take in a-c power, shoot d-c to electrolytic cells producing sodium chlorate. Power is a big cost item—and Ignitrons deliver d-c more efficiently than *any* other large-scale means. Long range result: lower costs, more sales, *more growth.*

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



Why has the Western labor force almost doubled since 1939?

Count up the manufacturing workers in the West—the men who turn out the goods. Since 1939 they've increased by 83%, almost double. The over-all U.S. gain: 51%. On this yardstick, Western industry is growing *60% faster than the U. S. average.*

Why the big boom? Because the West has raw materials, topnotch labor, and plenty of purchasing power. And with this industrial growth, more needed goods are made at home; and capital to finance *still more* new industry is generated (since 1939 Western bank deposits have quadrupled!).

All kinds of industry have helped spark the boom and Westinghouse is proud to be one of them. Electrical manufacturing is one of the West's fastest growers. Since 1939 its production workers have increased *four times,* its productive value *six times.* The biggest producer of all in this booming Western industry is the Westinghouse plant at Sunnyvale, California. And seven other Westinghouse plants in the West do their share to brighten the picture.

All these Westinghouse plants turn out cost-cutting electrical equipment that helps other industries grow. And they supply the apparatus to generate the power that every industry needs.

As a big factor in Western growth, Westinghouse is a good company for you to do business with. The West in our name really means something. When you have a job for electricity to do, get in touch with your nearest Westinghouse office.

J-94833-A

Westinghouse

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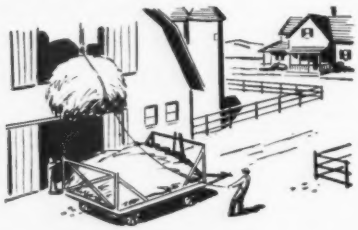
Banks have a way of keeping their customers' comfort well in hand. Many have found American Blower Fans and Capillary Air Washers keep air refreshingly clean and customers and employees delightfully cool. Using fans and air washing equipment as a combined unit is a highly effective method of providing comfort cooling, yet its cost is surprisingly low. If you're interested in similar equipment for your business, call our nearest branch office.

BUS TERMINALS PROFIT . . .

Like any business, a big metropolitan bus terminal needs to maintain a pleasant atmosphere. And we're proud to report that one of the country's largest terminals recently ordered 85 American Blower Type A Conditioners. These reliable units are designed for summer cooling and dehumidifying and winter heating and humidifying. Type A Conditioners might prove an equally profitable investment for you since the advantage lies in being able to meet the climate conditions of any season with a single unit.



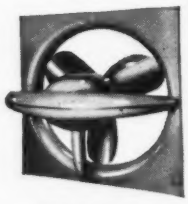
FARMERS PROFIT . . .

They put air to work down on the farm, too. Drying a big barnful of damp hay used to be a problem, but no longer. Enterprising farmers around the country use American Blower Hay Curing Fans to speed up drying time. More hay is cured, hence more dollars in profit. For helpful information on hay curing fans, consult our nearest branch office.

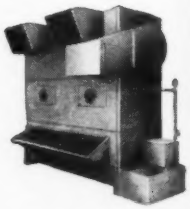
LOOK US UP . . .

With our new plant in San Leandro, Cal., we can save you time, money and provide you with faster service on most American Blower products. For data, call or write our nearest branch office.

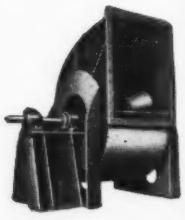
Unit Heaters



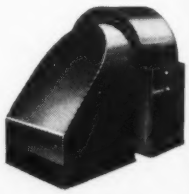
Ventura Fans



Air Conditioning Equipment



Industrial Fans



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Bouquets and . . .

Editor, *Western Industry:*

We wish to compliment you on the excellency of the contents of the industrial relations survey in your Review and Forecast Number.

BENT DAMSGAARD
Pacific Maritime Association,
San Francisco, California.

* * *

Editor, *Western Industry:*

You people have done a very good job with this Review and Forecast Number. The labor analysis has been handled very well. Perhaps you will be able to do a better job in the 1952 Review and Forecast Number as to the forecasts. This is no reflection on the forecast part of the 1951 number. It's just that I am hoping that all of us can see a little further into the future.

C. L. IRVING, Secretary,
Pine Industrial Relations
Committee, Inc.,
Klamath Falls, Oregon.

* * *

Editor, *Western Industry:*

We like your magazine and found that the Annual Review and Forecast Number is something that we look forward to seeing, in particular, each year.

E. F. BAUMER
Director of Public Relations
The Prudential Insurance
Company of America,
Los Angeles, California.

* * *

Clear Thinking

Editor, *Western Industry:*

Mr. Dye has called my attention to your editorial in the November, 1950 issue (The Unpolitical Kilowatt) which I have in turn called to the attention of other executives.

It is refreshing to read an editorial so fairly expressing clear thinking upon an important subject.

The members of Mr. Dye's Industrial Development Unit are regular readers of your publication and have often quoted material from its pages. They refer to it as truly representative of western industry, as its name implies.

CHAS. C. SNYDER
Business Agent—Power System
Department of Water and Power
The City of Los Angeles.

* * *

Trends and Pressures

Editor, *Western Industry:*

I have just gotten around to reading the report on *Western Industry's* survey of operating methods and systems, installment number 7. This is certainly an interesting report, and undoubtedly the trend upward in the use of scientific Industrial Engineering techniques will take a much deeper pitch under the pressure of armament and reduced availability of man power.

I will certainly read your subsequent articles with interest, as our own plant has considerable interest and need for increased use of Industrial Engineering.

M. R. Bell,Factory Manager
Arrowhead Rubber Company
Redwood City, California

EDITORIAL COMMENT

Late, But Not Too Late

IT IS NOW pretty much an old story that the U. S. Bureau of Reclamation has set up a division at Salt Lake City under the imposing title of "United Western Investigation" and that diversion of water from tributaries of the Columbia River near their headwaters into the Colorado will be one of the projects surveyed, also "other more direct means" (to quote Kenneth G. Tower, chief of the power division of "U. W. I.") of diverting water from the Columbia to Los Angeles.

If things drift along in this manner, with the Reclamation Bureau doing all the planning and building up the idea of a super-grandiose project that will solve all of the West's water problems, we may see the whole West split wider apart over something of this kind than Arizona and Southern California are at present over the division of waters of the lower Colorado. Sooner or later we will have to wake up to fact that both the Reclamation Bureau and the Army Engineers are not free from self-interest in many of their projects, and that many of their "benefits" for the West are in part sales campaigns to make "bigger and better bureaus." Consequently it is time for all the people of the West to begin some studies of their own of the overall water situation.

While the President's Committee on Water Resources Policy has done an excellent job in the main on a national basis in endeavoring to set up a pattern for screening the nation's water projects so we won't "dam ourselves broke," its conclusions regarding specific projects may not necessarily be correct. More study is needed, not only about where to get the water, but also how to use it. And in this last connection, it is pleasing to note that this committee report ranks industrial demands for water as just as important as those of irrigation and domestic service.

Some people feel that it is not a case of finding more water, but making better use of what we have. For example, there is a growing realization that we may be over-irrigating, and that less water, better applied, is more desirable.

Unexpected Opportunities

YOUNG ENGINEERS are a somewhat neglected Western industrial product. There just aren't enough of them. Dr. Hugh H. Skilling, head of the Stanford University electrical engineering department, told an American Institute of Electrical Engineers meeting in San Francisco recently that nation-wide figures collected by the Manpower Committee of the American Society for Engineering Education show the following facts:

"Take the size of the June 1950 engineering graduating class of the nation as 100. Next year's class will be only 70, or 30% less. In 1952 it will be down to 50, and in 1953 still lower, 40, i.e., 60% off."

And Dr. Nat H. Godbold, of the Idaho Operations Office of the U. S. Atomic Energy Commission, speaking of possible Idaho contributions to the AEC program says, "the proper development of atomic energy, and its expansion into private industry, are going to require a large staff of trained personnel. It is hoped the universities will gradually produce graduates in nuclear physics and engineering who can undertake this work directly after their graduation and without extensive training in AEC installations."

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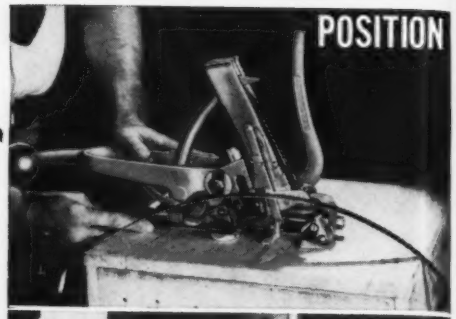

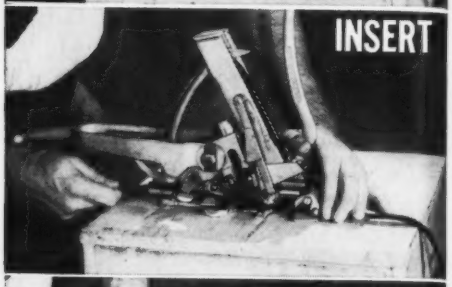

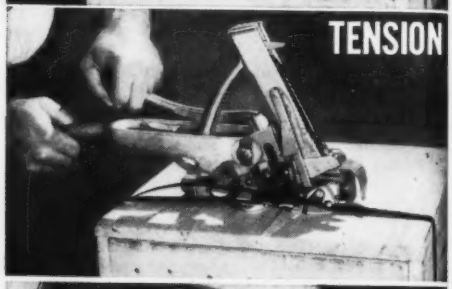

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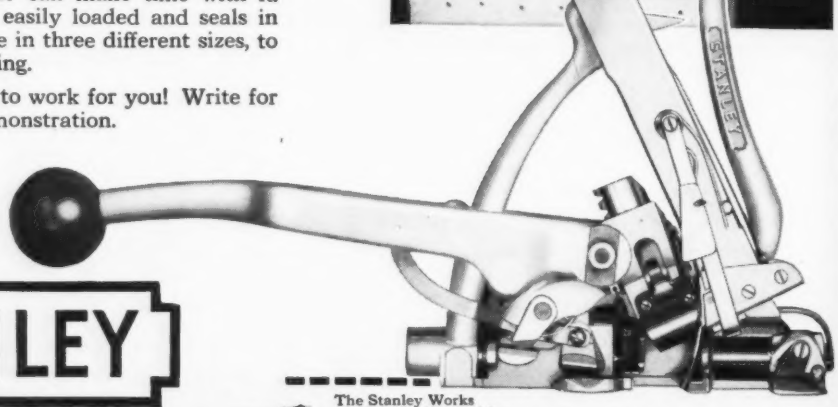

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CALENDAR OF MEETING

Feb. 26—March 2—5th All-Industry Frozen Foods Convention, at St. Francis and Palace Hotels, San Francisco. E. J. Watson, chairman.

March 1-2—Western Candy Conference, regional convention at San Francisco. Contact Tom Swan, Chrmn., 2201 3rd St., San Francisco.

March 1-2—Oregon Heating Industries, at Multnomah Hotel, Portland. Contact Bill Alexander (CA 1951), 1221 Failing Bldg., Portland.

March 6-7—National Marketing Conference, sponsored by U. S. C. of C., and hosted by San Francisco and Oakland C. of C., at St. Francis Hotel, San Francisco. Contact Dunlap C. Clark, Central Bank, Oakland.

March 10—Greater Portland Management Assn., at Multnomah Hotel, Portland. Contact Floyd Hewitt (VE 4181), Dairy Cooperative, Portland.

March 12-14—Northwest Canners Association, regional meeting at Hotel Davenport, Spokane. Contact Mr. Tulley, Board of Trade Bldg., Portland.

March 15-16—Industrial Waste Conference, Washington State College, Pullman, Wash. Contact Prof. Fred Erickson.

March 15-17—Fifth Annual Industrial Electrical Show, sponsored by Electrical Maintenance Engineers Association of Southern California, at Shrine Convention Hall, Los Angeles. Contact George Larsen, Larsen-Hogue Electric Co., Los Angeles.

March 19-23—Seventh Western Metal Congress and Exposition, Civic Auditorium, Oakland, Calif. Contact Wm. Eisenman, Managing Director, 918 Fallon St., Oakland 7, Calif.

March 22-23—Illuminating Engineers Society, at Davenport Hotel, Spokane. Contact Mr. Plowman, (MA 5121), Spokane.

March 22-23—Pacific Northwest Industrial Waste Conference, at Pullman, Wash. Contact Division of Industrial Services of the Washington State Institute of Technology, Pullman, Washington.

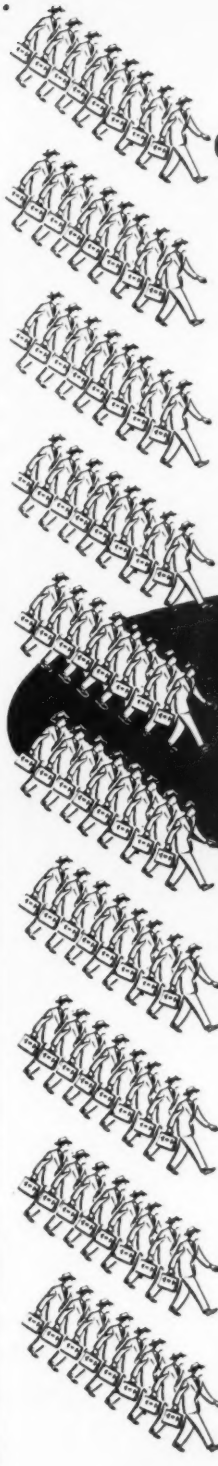
March 24—Pacific Northwest Advisory Board, at Portland. Contact A. M. Cloninger, 624 Vance Bldg., Seattle, Washington.

March 26-27—Automotive Electric Assn., at San Francisco. Contact S. W. Potter, Exec. Sec., 800 Michigan Bldg., Detroit 26, Mich.

March 27-30—Intermountain Logging Conference, at Davenport Hotel, Spokane. Contact Chas. Keim, Kalispell, Montana.

March 29-30—West Coast Lumbermen's Assn. regional meeting at Multnomah Hotel, Portland. Con-

(Continued on page 25)



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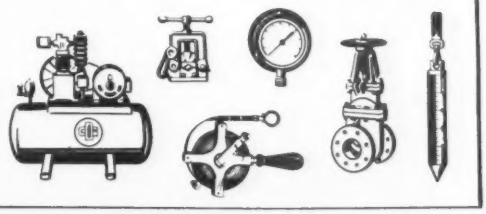

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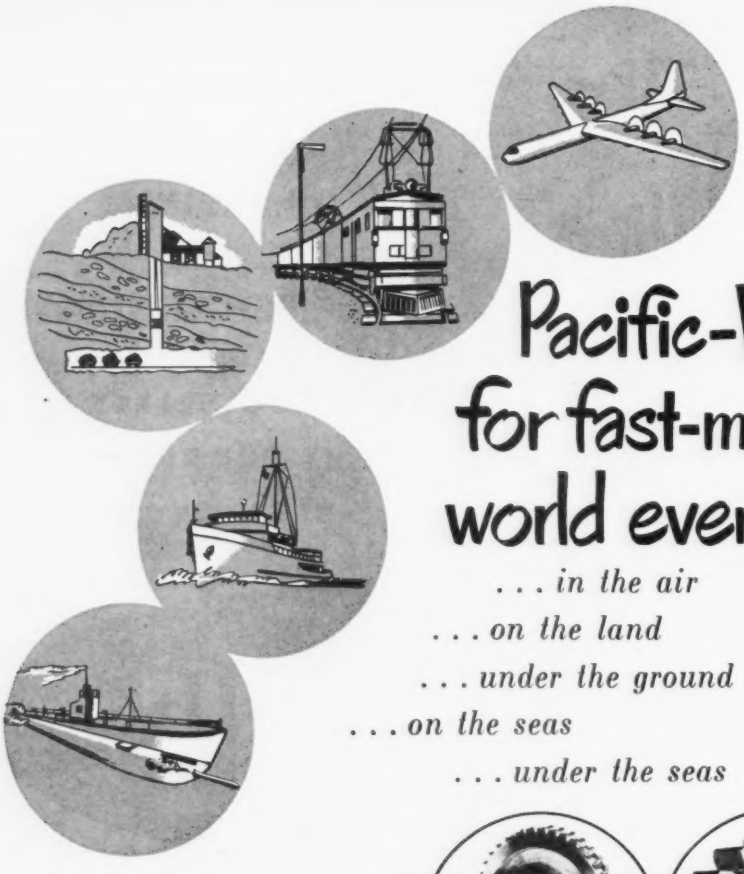

Pacific-Western Gears for fast-moving world events

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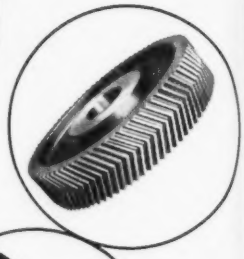
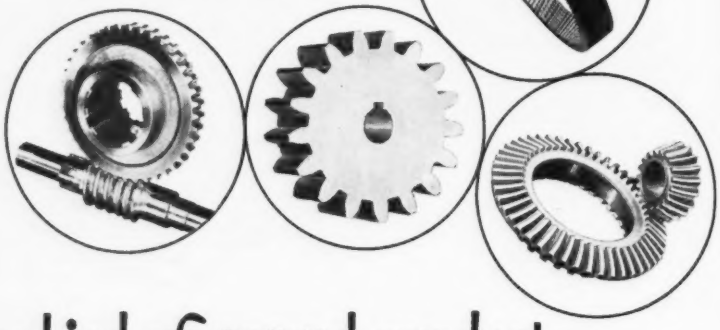
. . . on the land
. . . under the ground
. . . on the seas
. . . under the seas





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CALENDAR OF MEETING

(Continued from page 23)

tact H. V. Simpson, 1410 S.W. Morrison St., CA 1691.

March 30—Western Frozen Food Processors Assn. annual meeting at Casa del Rey Hotel, Santa Cruz.

Apr. 4-6—Association of American Battery Manufacturers, at San Francisco. Contact Walton R. Smith, Pres. No. Calif. Battery Club, c/o States Batteries, 1 Arkansas St., San Francisco.

Apr. 10-11—Wood Products Clinic, at Davenport Hotel, Spokane. Contact Mr. Batdorf, Spokane (MA 2526).

Apr. 16-18—Pacific Northwest Bakers Association, at Multnomah Hotel, Portland. Contact M. J. Holbrook, 623 S.W. Oak St., (BR 0553), Portland.

April 20-21—Pacific Northwest Purchasing Agents Conference, at Multnomah Hotel, Portland. Contact Don Woodman, Purchasing Agents Assn. of Oregon, P. O. Box 1269, Portland, WE 6796.

Apr. 23-24—Pacific Northwest Trade Assn., at Multnomah Hotel, Portland. Contact Arthur J. Farmer, Chamber of Commerce (AT 9411), Portland.

Apr. 27—Industrial Minerals Congress, at Portland. Contact R. S. Mason, Woodlark Bldg. (BR 2276) Portland.

May 7-9—Northwest Electric Light & Power Assn., Business Development Section, at Multnomah Hotel, Portland. Contact Berkeley Snow, Corbett Bldg. (AT 7871), Portland.

May 8-11—Insulation Board Institute, at San Francisco. Contact B. J. Blackburn, Mgr., 111 West Washington St., Chicago 2, Illinois.

May 14-19—American Trucking Assn. at San Francisco. Contact Kenneth Beadle, c/o Pac. Inter-Mt. Express Co., Oakland, Calif.

May 16-18—Northwest Electric Light & Power, at Davenport Hotel, Spokane. Contact Berkeley Snow.

May 24-26—Washington Motor Transportation Assn., at Davenport Hotel, Spokane. Contact Mr. Carleton (MA 7131).

May 31-June 1—Western Forest Products Safety Conference, at Multnomah Hotel, Portland. Contact E. H. Crosby, Columbia River Loggers Assn., Portland. BR 0479.

June 10-13—Triple Industrial Supply Convention, at San Francisco. Contact Exec. Secy. Natl. Supply & Machinery Distributors Assn., H. R. Rinehart, 505 Arch St., Philadelphia 6, Pa.

June 14-16—SPI Pacific Coast Chapter conference, the Society of the Plastics Industry, at Tahoe Tavern, Lake Tahoe, Calif.

You'll often save enough *in labor-time alone,* to pay for the *right* Snap-on Tool to reach hard-to-get-at spots such as these generator coupling flange nuts. The more important savings in "down-time" are so much "velvet."

On this job, as you can see, there's no room for the head of a ratchet wrench, nor is there either jaw-room or handle-clearance for an open-end wrench. But a Snap-on L-53 Sliding Bar does the trick, with a safe, sure, snug fit and an easy half-turn-at-a-time action, without once disturbing the grip of the socket.

Ten to one, there are maintenance or overhaul jobs just as time-wasting, potentially, as this in your plant. And the odds are still better that there are many Snap-on Tools that would swiftly pay for themselves. Here Snap-on's nation-wide tool service can be mighty helpful!

Write for industrial catalog and 104-page general catalog!

SNAP-ON TOOLS CORPORATION
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Kenosha, Wisconsin

*Snap-on is the trademark of Snap-on Tools Corporation.

RYERSON STEELGRAMS

Swift-changing conditions in today's steel market are so difficult to follow—perhaps these few paragraphs will prove helpful.

Warehouse steel stocks were again recognized as vital to defense by the Government's NPA order which allots a share of "free tonnage" production to steel distributors. The regulation is helpful. However, even at this early stage, Rated Orders and special government programs have substantially reduced total "free tonnage" — reducing the share going to distributors proportionately.

We are doing everything possible to maintain reasonable stocks for warehouse buyers. But, as we see it at the moment, we shall have less steel to distribute among our many customers in the coming months. It will be helpful if you order only for immediate needs and extend DO ratings whenever possible.

More steel will be available in some specialized cases. Example: Ryerson stocks of aircraft alloys. New program gives Ryerson plants a range of more than 400 sizes, finishes and conditions of aircraft alloy bars and strip. Included are alloys for aircraft parts manufacturers, airframe makers and engine builders conforming to new MIL-S and to AMS specifications. Aircraft quality stainless stocks have also been enlarged.

More on stainless and alloys — Some steel users may not know that the Government is issuing a single set of MIL (Military) specifications to replace the different U. S. Army, Navy, Air Force, Air Force-Navy, and Federal specifications previously in effect. The new specifications for a few products have yet to be published, but Ryerson alloy and stainless stocks assure a warehouse source for all the important MIL "specs" now in effect and, as additional products are covered, Ryerson stocks will be immediately brought into line.

Ryerson tubing stocks, not affected quite as much as some products by the tight steel market, are being enlarged to include Rockrite tubing (with close I. D. tolerance and better I. D. finish for hydraulic cylinder applications) and pressure tubing to JIC "specs". Fairly adequate stocks of both are in prospect. This is in addition to seamless and welded mechanical tubing, extra heavy wall hot rolled tubing, structural tubing.

Changes on the nation's railroads are not confined to rolling stock, in railway shops alloy chain is finding increased acceptance as a replacement for wrought iron slings. Reasons are easy to find. The alloy chain packs three times the tensile strength of wrought iron. Lasts 5 to 15 times longer. Taylor Made Alloy chain, available from Ryerson, costs little or no more than wrought iron. It is widely used for overhead lifting in most all industries. Other types of chain also available for prompt shipment.

Wire rope, especially desirable where chain may cause damage, is currently available in a wide range of types and sizes. Shipment from Ryerson is prompt.

Availability of high tin content babbitt metal is threatened by the short tin supply. Not affected — Ryerson production of Glyco babbitt metal. Made by a special process, it has physical properties equal to those of high-tin babbitt, costs considerably less, and remains in good supply.

Indications are that metal fabricators contemplating purchase of machinery and tools should make an early decision on placing orders. Ryerson can still make fairly prompt shipment on many types, but demand is strong and delivery schedules are lengthening. All but lighter tools are currently offered on the basis of 5 to 8 months.

JOSEPH T. RYERSON & SON, INC.

LOS ANGELES PLANT: Box 3817, Los Angeles 54. Plant: 4310 E. Bandini Blvd. Phone: ANgelus 2-6141. From San Diego (No toll) Phone: ZEnith 6660.

SAN FRANCISCO PLANT: Box 188, Emeryville. Plant: 65th & Hollis Sts. Phones: OLympic 2-2933, ENterprise 10176.

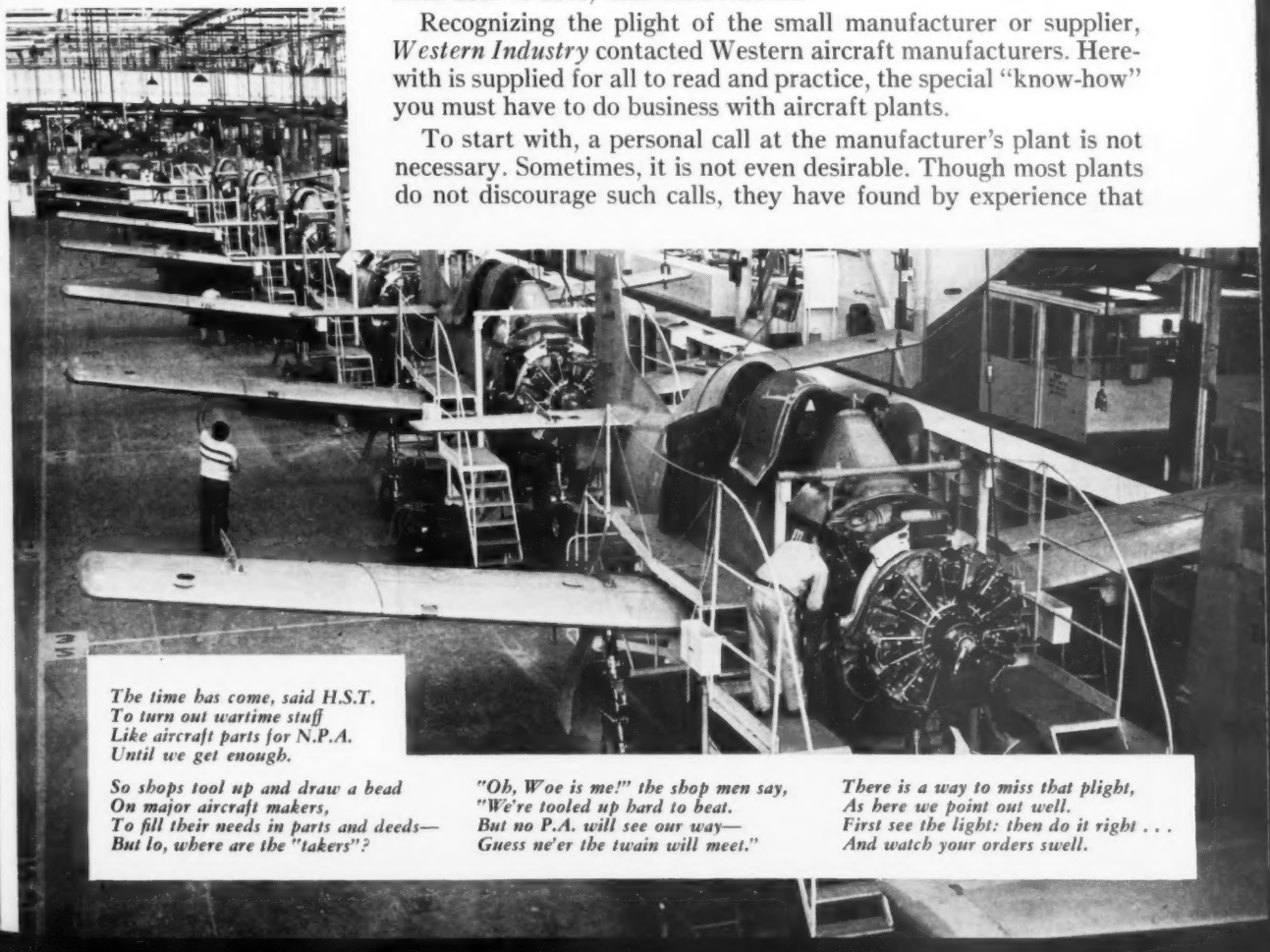
WESTERN INDUSTRY

Here's the "know-how" you need to get AIRCRAFT SUBCONTRACTS

AS AN OLD SAYING goes, "The rich get richer and the poor get children." Translated into today's industrial language, plants with "know-how" (to get aircraft subcontracts and purchase orders) are getting the business; those without it are going begging, from door to door, with little success.

Recognizing the plight of the small manufacturer or supplier, *Western Industry* contacted Western aircraft manufacturers. Herewith is supplied for all to read and practice, the special "know-how" you must have to do business with aircraft plants.

To start with, a personal call at the manufacturer's plant is not necessary. Sometimes, it is not even desirable. Though most plants do not discourage such calls, they have found by experience that



The time has come, said H.S.T.
To turn out wartime stuff
Like aircraft parts for N.P.A.
Until we get enough.

So shops tool up and draw a bead
On major aircraft makers,
To fill their needs in parts and deeds—
But lo, where are the "takers"?

"Oh, Woe is me!" the shop men say,
"We're tooled up hard to beat.
But no P.A. will see our way—
Guess ne'er the twain will meet."

There is a way to miss that plight,
As here we point out well.
First see the light: then do it right . . .
And watch your orders swell.

usually the caller is not prepared with documentary data the manufacturer requires for his records.

Most manufacturers prefer to make initial contact with a vendor through a letter from the vendor on his formal letterhead. Then the manufacturer will follow through with further contacts, as necessary, to complete his investigation to qualify a potential subcontractor.

What, Why and How

What manufacturers want, in short, is a *complete* set of data that tells them all they need to know about your facility. That data should be prepared in the form of a brochure, if possible, and a copy left with each manufacturer when he is first contacted.

Sufficient information should be set forth to allow a realistic evaluation to determine how you may best fit into the manufacturer's program. Your presentation should be concise, free of extraneous data, and it should provide the prime contractor with a record for future reference. When calling on manufacturers, try to limit your stay to ten minutes.

Here is what, how, and why to prepare such information:

1. *List your facilities.*
   (a) That means a complete list of power machines and equipment, identified by factory number or catalog type. Include table size on mills, swing and distance on centers on lathes, spindle bore, capacity, etc. Note the age and condition of each machine tool.
   (b) Do not include supporting hand tools and equipment.
   (c) List types of processing and/or welding facilities. Note if Air Force or Navy approved.
   (d) List separately equipment used primarily for tooling.
   (e) List equipment on order but not on hand. Include expected delivery date.
   (f) List your facilities for inspection.
   (g) Summarize a total of your plant capacity and equipment.
2. *List your plant property.*
   (a) Indicate your shop productive area in square feet, and the type of building construction. Include the total extent of possible plant expansion.
   (b) List any railroad sidings or shipping facilities you may have.
   (c) Indicate methods of exercising plant security in accordance with government requirements.
   (d) List also number of persons normally employed and maximum number of employees for whom facilities are available.

So much for the listings of physical factors. That is not all that is needed to become a subcontractor, however. Here are some other points, fully as important from both your standpoint and the prime contractor's:

3. *List your "know-how," your labor resources, key personnel, and technical background.* That means special skills possessed by company personnel. It means previous experience with aviation parts and assemblies. It means names of companies, with similar requirements, for whom work is presently being done.

A Typical Form Used in Requesting Information From Subcontractors

(Courtesy Northrop Aircraft, Inc.)

OUTSIDE MANUFACTURING FACILITIES SURVEY
of

.....

In order that we may evaluate your facilities for sub-contracting purposes, please answer the following questions:

1. Full name of Company: .....
2. Address of Office: ..... Phone .....
3. Address of Plant: ..... Phone .....
4. a. Individual: ..... Partnership: ..... Corporation: .....
   b. If not a Corporation, is Company name or Partnership legally registered? .....
   c. Subsidiary of .....
5. List Principal Officials (3): .....
6. List names of companies for whom work is being done (3): .....
7. a. Total number of shop employees: .....
   b. Number of shifts being worked: ..... Hours per shift .....
8. Name and Address of Bank: .....
9. Names and Addresses of Three Credit References (Concerns from whom you have purchased materials) .....
10. In the event that we deem it necessary, would you be willing to submit a financial statement? .....
11. In the spaces provided below please list all your equipment facilities and give complete specifications, including age and condition: .....

.....

11A. Inspection Facilities: .....
12. Remarks: .....

Please answer the following questions so that we may have more complete information regarding your available production facilities.

1. Type of work company is prepared or equipped to do: .....

.....

2. Special skills possessed by company personnel: .....

.....

3. Previous experience with aviation parts and/or assemblies, especially as this includes working to close tolerances: .....

.....

4. Capacity of plant now available: .....

.....

4. *List your bank references.*
5. *Tell what you have done, and what you can do best. Tell how much you can do now.*

It is the experience of large organizations that their procurement and subcontracting departments are constantly in receipt of letters from all types of businesses soliciting purchase orders or subcontracts. Are laboratory facilities available for research and development? Is so, state phases of research and development for which qualified.

A purchase order covers a product that normally would not be manufactured in a manufacturer's place of business. A subcontract is considered as covering an item that would normally be manufactured in the manufacturer's own shops, but for good reason, the manufacturer desires other organizations to manufacture that item on a subcontract basis.

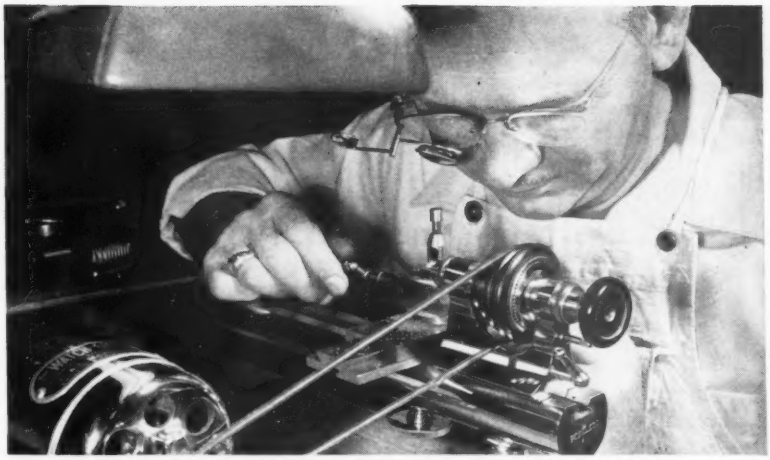
The vast majority of companies and individuals that seek subcontracts from prime contractors do not qualify to be legitimate subcontractors.

Generally, the items that prime contractors would subcontract are of a nature that are covered in every minute detail by applicable Government and company specifications. These specifications are of a technical nature, and in instances at source level (subcontractor's plant) may require analysis by competent electrical, mechanical, chemical or aeronautical engineers in order that compliance to specifications is obtained.

In some instances, and rather frequently, it is necessary for you as a subcontractor to maintain testing or analysis laboratories to determine that elements of specification are complied with.

Additionally, you must be thoroughly familiar with all inspection requirements, Government and company included, and further must be fully acquainted with all of the applicable packaging and product protection methods that must be conformed to in the delivery of end products.

Some contracts require precision like this setup at North American, to drill small holes in an air bearing on a Bridgeport universal mill.



All subcontracting work does not consist of hogging out pounds of metal from stock blanks. Small precision parts for instruments being made on a watchmaker's lathe.

Many Things to Know

There are many other details of requirements that you, as a subcontractor must know. If you have availability of manpower of the type that has the skill and knowledge to interpret all these requirements, then you must have a reasonably large organization to offset the resulting overhead and maintain itself in a competitive position to other organizations.

After many years of successful subcontracting Douglas Aircraft, for example, reflects that it is not desirable to encourage all potential sources of supply or subcontractors to have their representatives make personal contact. These personal contacts result in the high majority of cases in no mutual benefit either to the source or to our company.

After trying many methods, they have concluded that a letter contact is much preferred. In this respect it is desirable that such a letter contact be of a singular nature rather than a chain of correspondence.

"To this end," says Douglas, "our company advises potential sources of subcontracting to submit a brochure. The brochure should include the name and address of the company, number of square feet currently occupied by production and non-production units, the number of personnel now on the payroll, and the availability of additional space and personnel, to the maximum capacity immediately available should a subcontract be given.

"Included also in the brochure should be a description of the products that the company has been producing and a complete list of machinery available and/or used in the production.

"Comment should also be included in the brochure as to whether or not the potential subcontractor has ever produced parts for aircraft manufacturers or parts for other manufacturers or prime contractors where such parts were made and inspected against Government and/or large industrial organizations' specifications and inspection requirement procedures."

Any other information that you have available regarding history, additional facilities, financial status, railroad sidings, or shipping facilities, etc., all help in providing a clear understanding in respect to your qualifications in relation to the item or items that are being considered for subcontract.

Major aircraft manufacturers have in the past, and are still continuing to make use of small businesses in accordance with the desires of the Government. A large majority of their current sources of supply are classified as being small business. (Some of the larger sources of supply are the result of the growth of small businesses which through long years of serving these major plants have grown successfully.)

In analyzing those that have grown, it is shown that aggressive management, economical operation, and willingness to remain fully informed have resulted in their success.

Information for this article was obtained from the following Western aircraft manufacturers: *Lockheed, Northrop, Consolidated-Vultee, Douglas, North American, Boeing,* and *Hughes.*

Electroplate faster and better

with this method. Plate deeper, smoother, and eliminate polishing. A real production tool.

AN IMPROVED METHOD of electroplating has recently been developed. It offers you these following advantages:

1. You can plate faster.
2. You can plate into deep cavities with ease.
3. You can plate to an almost indefinite thickness.
4. You can produce a plated surface that is smoother than the surface of the base metal itself.
5. You can plate metal of increased density.
6. You can reduce (and in many cases, eliminate) polishing operations.

General Plating Technique

There are several elements in tank plating technique that can be varied within certain limits to obtain optimum speed and quality in plating. Most common among them are:

1. Current.
2. Time.
3. Temperature.
4. Agitation.
5. Percentage of metal concentration.
6. pH.

But beyond relatively narrow limits established by laws of physics and chemistry, and currently in common commercial practice, these cannot be changed. Industry has experimented with them and combinations of them until well-defined principles and combinations have developed.

New Method's Advantages

However, by using a method known as "Periodic Reverse-Current Electroplating," many of these accepted calculations are now upset. Definite and considerable advantages result. Plating production speed is only one of them.

By

ROY C. HENNING

Western Industry's Consulting Editor Electricity and Electronics

It is relatively simple to apply this method to existing set-ups. To understand the reasons for reversing polarity of the plating current, as the process name indicates, let us first analyze the theory of conventional, or continuous current plating.

Plating Theory

As current flows through the plating tank from anode to cathode, it picks up ions of plating metal in the electrolyte and deposits them on the cathode (article being plated). During this process, however, an incidental action that takes place is undesirable.

This "fly in the ointment" comes about very soon after current is made to flow from anode to cathode, and it presents itself in this manner: A thin layer of electrolyte that envelopes the cathode becomes rather lean in metal ions because the ions which were originally there are immediately attracted to the cathode and hastened on their way by application of current. Their departure from the electrolyte is faster than their replenishment from other areas in the electrolyte. Hence, the liquid immediately surrounding the cathode becomes depleted of plating ions.

This, of course, is a principal bottleneck in plating production time: production itself is thereby restricted.

If you attempt to step up the current flow, in an attempt to speed your plating time, you will find that these undesirable results will be magnified. First, the higher current flow will cause the electrolyte to become practically wholly depleted of metal ions in the area immediately surrounding the cathode. And then, water in the electrolyte will start breaking down by electrolysis, and hydrogen bubbles will start to appear on surfaces of the work being plated.

This curtain of hydrogen bubbles (known as "gassing") will still further hinder the deposit of metal ions.

This Is What Happens

Plating currents are usually held down below the point of gassing, because when gassing occurs the quality of the plating applied will be rough. The few ions that can pierce this curtain of hydrogen to become deposited on the surface of the cathode will produce an uneven surface texture. This same curtain of hydrogen kept many of the first batteries from delivering a continuous current of uniform level. Many methods were devised to get around that problem. But they all attacked effect rather than cause, with the result that this problem still managed to exist and plague the pioneer experimenters.

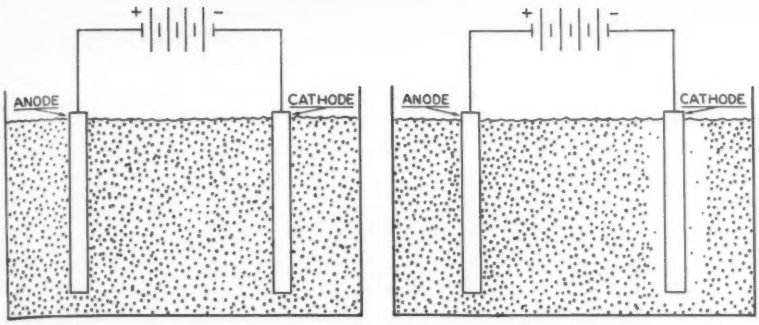
Under any given plating situation, in order to get more metal deposited on your work, you must either (1) increase current or (2) increase plating time. But increasing current brings us up against that stone wall—gassing. Increasing time reduces production and profits.

Right here is where the value of periodic reverse-current plating becomes apparent. It will allow you to increase your current level considerably over the maximum value per-

An Industrial Development—

This process was originally unveiled to the industrial public about four years ago by George W. Jernstedt, manager of electroplating projects for Westinghouse Electric Corporation. Since that time, the process has been adopted by many plating operators, for special purpose work.

Electroforming, such as is described at Stanford University's microwave laboratory, is a relatively new application of the process. Its particular value is that of providing highly accurate inside dimensions of pieces formed, that would be difficult to attain by other means. In the case of microwave wave guides, accuracy of dimension is more important than cost in money or time to produce a unit.



LEFT: Start of normal plating action, with ions evenly dispersed in electrolyte. RIGHT: Action of current flowing in one direction depletes ions around cathode, impairs plating time and quality. Periodic Reverse-Current Electroplating solves these problems.

missible by conventional continuous methods.

Why Polarity Changes

Using this reverse-current process, articles being plated have their polarity changed for short intervals. During the period when the work being plated changes from cathode to anode, a small amount of the metal that was applied previously is removed.

The metal removed is that part that was last applied during the normal plating cycle. It is the porous, unsound part of the plating that was put on when the electrolyte surrounding the work was depleted of ions. This metal that is removed, again assumes the form of ions in the electrolyte solution.

When this happens, the electrolyte immediately surrounding the work-to-be-plated becomes a dense cloud of ions, instead of remaining a lean, depleted solution.

What Happens in Solution

These ions are clinging around the work like flies on a screen door in summer time. These ions are in the best place to do the most good now, because they are immediately available for plating again.

Thus, when the work again goes into the plating cycle (polarity changes, and the work again becomes the cathode) it can draw on this rich layer of electrolyte loaded with ions. Hence, an even, uniform, and hard coating of metal will be applied.

A graphic representation of reverse-current compared with continuous current methods of plating is shown in an accompanying illustration. Continuous current, as supplied by a rectifier, a generator, or a battery, is shown. Reverse-current cycles are also illustrated.

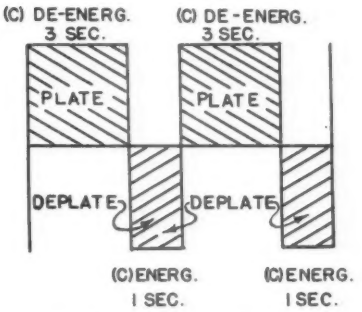
You can see that during the first part of the reverse-current cycle, a normal plating current is supplied to the cathode for some two to forty seconds. Then the polarity is reversed for one to five seconds, while maintaining the same magnitude of current. The rates of plating time vs. deplating time may be varied, according to application, from as little as 2-1 to as much as 8-1. The cycle selected is repeated for as long as it is necessary to deposit the required amount of metal in the form of plating.

During that part of the reverse-current cycle when the cathode becomes the anode, the amount of metal removed ranged from 10% to 50% of the coat previously applied by the last plating part of the cycle.

Ratio of time of "plate" vs. time of "de-plate" is determined by the degree of hardness or smoothness desired in the finished job. The smaller the ratio, the smoother and harder the finished plate.

You might think, first, that this process of deplating part of the time would surely prolong the time element in applying a given coat of metal. Strange as it may seem, though, it works out quite to the contrary.

You can use a higher level of current with this reverse-current method, and by reason of it you can more than offset any effects of the de-plating



Periodic Reverse-Current Electroplating operates on time cycle. Plating current flows in one direction three seconds, reverses for one second. Cycle repeats, ions stay evenly dispersed, plating quality improves.

cycle. Values of current several times higher than those used by conventional methods may be used, (these values may be determined by experiment): By use of shorter plating times, higher plating efficiencies result.

How You Can Convert Your Plant

Ways in which you can convert your present conventional plating methods to reverse-current applications are relatively simple. A choice of methods is open to you. (1) Current may be reversed right at the tank, regardless of power supply. (2) If a generator is used for the power source, the field current of the generator may be reversed.

James A. Pope, in charge of Stanford University's microwave laboratory plating section, checking on the operation of his tank agitators. Center rod, at lower left, is the movable member in each tank. (Other tank, not shown, is at far right, in line with the one shown, and agitated by the same mechanism shown.) Chain drive is activated by an electric motor with reduction drive, located below the table surface. On the shaft driven by that chain are (1) a cam, to provide properly interrupted current flow, and (2) two members that connect with the tank agitating rods. Shown suspended in the tank are several hangers holding microwave waveguides of differing dimensions, all in process of being electroformed.

Method (1) will probably lend itself more easily to a greater number of users.

By means of relays with heavy duty contacts, current may be reversed right at hangers in your tank. These relays can be actuated by motor-driven or electronic timers, or more easily yet by small time delay relays, or by cam-actuated contactors.

Whatever you choose as a means of timing, you must provide a means of adjusting the overall length of cycle and of varying the time ratio of plate to de-plate. Otherwise, you cannot realize full benefits from reverse-current plating.

Some experimentation will be necessary to determine these values. They will be affected by the electrolyte used in your tank.

Even if all conditions involved, current, time, temperature, agitation, percentage of metal concentration and pH, are not at their optimum level, distinct and noticeable improvements will still be apparent.

A Manufacturing Tool

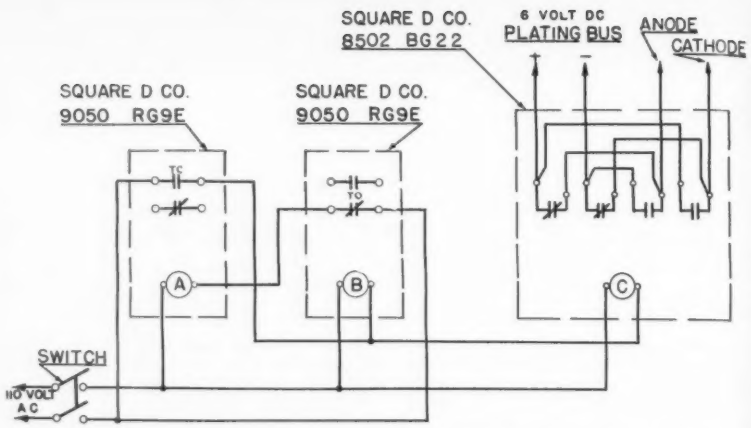
There should be no limit to thickness of the plate applied by this process. Stanford University is making microwave waveguides and other parts by this method of electroforming. A prime reason for selecting the periodic reverse-current operation is that internal finish of these objects must be held to very smooth and close tolerances. (Internal finish and close tolerance result from careful machining of the mandrel used.)

James A. Pope, in charge of Stanford's Microwave laboratory plating section, informs us that his electroforming is done in this manner:

"Our work is done in an ordinary acid copper bath containing 6.5 ounces of sulphuric acid per gallon of acid bath, and 27 ounces of copper sulphate per gallon of bath. Dacolyte is added to help produce a smooth, bright, fine grained deposit.

"Regular 18-8 stainless steel mandrels are used. A lucite cap is fitted to each end of each mandrel. Mandrels are cleaned by brushing them with an alkali-cleaner to remove any grease. Then they are rinsed in cold water until they are cool, before plating action is started. (Plating deposit starts to blister if copper is applied to a hot mandrel.) No further treatment is necessary.

"Clean, cool mandrels are then transferred to the acid copper bath and plated at a current density of 50 amp/sq. ft. until the mandrel is completely covered. Then it is brought back to 20 amp/sq. ft. After two hours, mandrels are transferred to a heated (95° F.) acid copper bath where they are then plated for approximately two weeks.



ELECTRIC CONTROL—Schematic diagram of the electric circuit developed for use at Eitel-McCullough Company, San Bruno, California. Time delay for periodic reverse-current electroplating may be accomplished either mechanically (see bottom of this page) as done at Stanford University or electrically, as shown above. Both methods arrive at the same end result. Use of this plating principle provides plants with a production tool they never had before.

"Heavy current fields are built up at the corners of the mandrel, but using periodic reverse current and a low current density (20 amp/sq. ft.) it has not been necessary to remove the work from the bath to remove any trees during the entire plating period.

How It Is Done

"The periodic reverse-current contactor plates two seconds on cathode and one second anode. Agitation is eight feet per minute cathode rod motion.

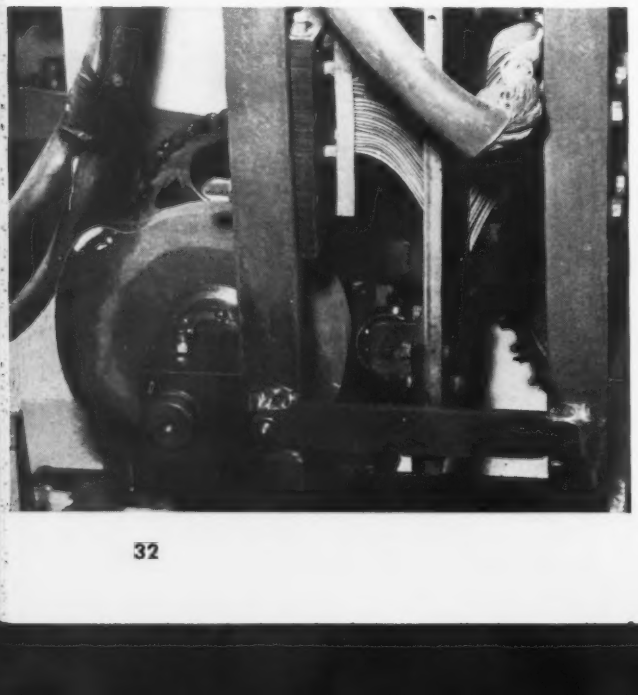
"A ¾ hp. motor runs a speed reducer. By a series of sprockets and chains, this runs both the reversing cam and the arms connected to the cathode rods.

"Tanks are situated at opposite ends of the table supporting this reversing switch. Current is supplied by a Udylite rectifier. Baths are filtered eight hours per day, to remove any foreign matter that would cause roughness of the plate.

"Each wave guide is plated to a thickness of .300", then taken from the bath and its mandrel is removed on a reverse arbor press. A machining mandrel is then inserted, and the waveguide is planed down to a wall thickness of .125".

"With proper bath control, temperature, anode to cathode spacing, agitation, current density and periodic reverse current, it is possible to produce a deposit that is oxygen-free, smooth, dense, and stress-free."

Eitel-McCullough, Inc., San Bruno, California, manufacturer of radio and television tubes, successfully employs periodic reverse-current electroplating as a means of doing a superior job on some component parts of Eimac radio transmitter tubes.



MECHANICAL CONTROL—

Here is the heart of Stanford University's time delay control. See also picture, bottom of page 31. Cam at left operates switch lever (vertical bar in center of uprights) to plate (toward left), to de-plate (toward right), as it makes contact with leaf conductors shown here.

Defense contract pools

Keep your plant busy and hold your workers on the job by pooling local plant facilities. Here's how it was done; can be done again

A DOWN-TO-EARTH plan to put small industrial plants back to work for the defense effort, and at the same time keep workers at home, has been proposed to Charles E. Wilson, Director of Mobilization.

This plan comes as a direct result of a series of conferences at the grass roots level, with hundreds of plant owners and operators in Kern, Tulare, Kings, Fresno, Madera, Merced, and Stanislaus counties, California.

One For All—All For One

Sparked by California's Central Valley Empire Association, a panel of five speakers toured the San Joaquin Valley for a period of three days and made a total of seven talks to hundreds of manufacturers and processors. Active interest was evidenced by overflow crowds of persons eager to get defense contracts.

John Roth of Merced, chairman of CVEA's Industrial Committee, announced four specific proposals in the accompanying telegram to Charles E. Wilson.

These proposals were offered as the culmination of the seven-county tour, based on talks with individual plant owners throughout the Valley.

Small Business Crusade

Key speaker on the five-man panel was John H. Tolan, San Francisco, president of Coordinated Manufacturers of Northern California. Tolan was formerly District Manager for W. P.B. in the San Francisco Bay area; he was U. S. Navy Liaison Officer on the Truman Investigating Committee, and later, on the Senate Small Business Committee.

He helped set up war contract pools during World War II, and told of some of the advantages accruing to manufacturers through industrial cooperation. Tolan stimulated interest among Valley plant owners by spearheading the crusade for small business to start getting contracts from the government.

Second speaker on the panel was Darwin Bryant, presently general counsel for Coordinated Manufacturers of Northern California, and formerly a Naval officer at Mare Island Navy Yard in charge of procurement during World War II. He recounted Navy's experiences with contract pools, and told some of the requirements as well as pitfalls for would-be subcontractors.

Nation's Most Successful Pool

Third on the panel was Earl C. Griffith, presently an engineer and contractor in Fresno, in the air conditioning business. Griffith was the engineer-manager of Fresno's Central California War Industries pool during World War II, and he is spark-plugging that activity to life again. His pool was the only one to receive the Army and Navy "E" with four stars.

Most of their business was done with Mare Island Navy Yard, to the tune of over $8 million worth of contracts covering more than 2,000 different items.

"Many of those items," said Bryant, "were supplied to the government at only a fraction of the cost of similar items produced by other sources."

Real Industrial Cooperation

Fourth speaker on the panel was Vern Redman, sales manager for Pacific Gas and Electric Co., San Joaquin Power division. Redman is also chairman of Fresno County's Industrial Committee, and he told how Fresno is cooperating with industry by supplying "tailored-to-measure" industrial sites. (See *Western Industry,* November 1950, page 54.)

Final speaker was James E. Howard, managing editor of *Western Industry,* who outlined the advantages of effective industrial publicity and told Valley plant men how to represent themselves and their operations in the press as well as how to evaluate what they read in the industrial press.

Planned action seeks results for you

WESTERN UNION TELEGRAM
January 25, 1951

Chas. E. Wilson,
Office of Defense Mobilization

California's Central Valley Empire Association has just completed a series of seven county-wide conferences on small business problems (Counties of Stanislaus, Merced, Madera, Fresno, Kings, Tulare and Kern).

We want particularly to help you do the job which you outlined before the Senate Small Business Committee last January 18. To this end we have met with hundreds of manufacturers and business leaders and officials of local Chambers of Commerce and with their Industrial Committees. All of the potential war manufacturers joined with us in these conferences and want to help you mobilize existing industrial capacity.

You are quoted in the press as proposing that the government arrange voluntary pooling of production facilities in order to assure small firms a role in the defense effort. Such voluntary war production pooled facilities exist in our area now. Such a pool, Central California War Industries, Inc., of Fresno, California which won the Army-Navy "E" and 4 stars in the last war has completed reactivation and is ready to work.

Defense Industries Inc., of Modesto, California has completed organization of 35 plants and both pools are having trouble obtaining contracts. We recommend:

1. Immediate transmission of your Small Business policy to Armed Services field procurement offices (where contract and program authority is lacking to employ our facilities).
2. West coast military and government industrial facilities should be directed to appoint small business contracting boards to screen out work suitable for our idle small plants, particularly shop work, repair and overhaul, and manufacture of replacement parts.
3. That your policy staff review part 30 of the Senate Small Business Committee hearings dated October 26, 1943, and entitled "Navy yard sub-contracting and the type C contract."
4. That field procurement officers be directed again to negotiate the so-called "Type C" contracts with war production pools.

Early action by your office directing uniform and proven contract procedure for small business involving jobs which these plants have successfully performed in the last war and are now prepared to perform in this emergency, will offset the shock of materials controls and the resultant curtailment of civilian production and will help utilize existing and idle production capacity in small plants. It will reduce requirements for new facility construction. It will increase security through geographical distribution of contracts and it will keep our workers at home.

JOHN ROTH,
Chairman Industrial Committee,
Central Valley Empire Association.

Ready for more machinery

Wood industry, where mills develop their own machines, finds need of process engineering

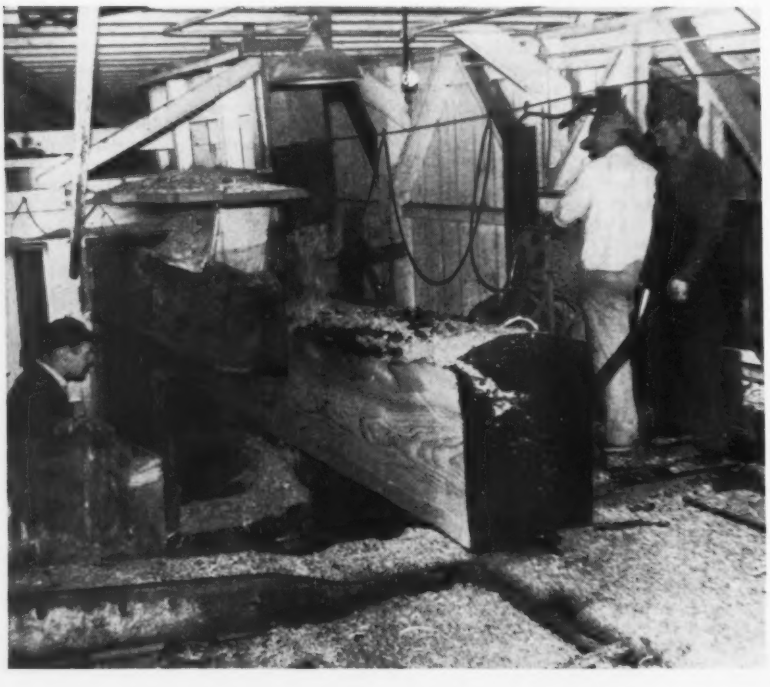
By R. H. PLOW
Consultant
Eugene, Oregon

WHEN a $9 billion industry speaks, its suppliers listen. The wood industry, the third largest in the country, has begun to realize that most of the development work on sawmill and other woodworking equipment has been done and, furthermore, financed by the individual mill. It has also begun to realize that this has not been true in other industries, even smaller ones, where the equipment manufacturers have carried on the development work and footed the bill.

This situation has caused the pigeon-holing of many handy gadgets, or large equipment, thought up on the spot by the owner of his millwrights to increase mill efficiency or to improve working conditions, but dropped for lack of facilities or engineering experience. These ideas are now going to the equipment manufacturer with a request to work out the engineering details and to incorporate them in the newest model.

Then too, the lumberman has not learned the use of research institutions nor the help that can be obtained from the temporary employment of consulting engineers. These two adjuncts to development have the advantages of engineering training and of general industrial experience which enables them to select accessories and procedures tested in other industries and to adapt them to the somewhat isolated lumber industry.

In older mills like this, sawmill carriages had no substitute for manpower. "Dogger" (at right front) sets steel dogs in place to hold the log. "Setter" behind him decides how wide the board will be cut. Captain of the crew is the "sawyer" at lower left.



The British Columbia Research Council of Vancouver, B. C., recently surveyed some 120 mills in their Province and tabulated the man-hours lost to the mill through shutdowns due to mechanical failures in each operation. Circular saw failures at the headrig led the field, followed closely by knife replacement and rotor unbalance at the hog. Then came failures on the log deck, bandsaw trouble, edger trouble and trimmer trouble. The facts are probably similar in this country. How much has been done to correct it?

Woods Operations

Power-driven saws have been generally adopted in woods operations. Mobile equipment shows the impetus given to all such equipment by World War II.

In the east, several new portable hogs and chippers have been developed to make possible more economical transportation of logging waste to pulp mills, board mills and fuel consumers. These machines are, in some cases, mounted integrally with small mills which reduce the waste to a size suitable for the chipper or hog.

Again in the east, where timber is smaller, the chemical killing of trees a year before felling is coming into limited use. With this method, when the trees are felled, the bark is loose and easily removed.

Use of Barkers

Two types of hydraulic barkers are currently in use in the larger mills. A less costly mechanical barker is being used successfully at some redwood mills. Small hydraulic slab barkers are in the development stage.

Sawmill Developments

At the headrigs, cooperative efforts have been made by the filers and the saw manufacturers to work out a correlation between sawtooth spacing, saw speed, rate of feed, and local and seasonal conditions in the log. There are also on the market bandsaws suit-

able for the smaller mills now using circular rigs. Some of these are of new design and some are redesigns of resaws.

Carriage drives in the large mills where steam is available remain basically unchanged. Hydraulic and pneumatic drives with wide speed range and close speed control are coming on the market for small mills. Some of these are of factory and some of home design.

One of the most successful carriage drives is of the latter derivation and has been in operation for three years with less than 20 hours of maintenance. Design blueprints are now in the hands of a machinery manufacturer for commercial production.

Edgers and their saw shifters are receiving attention both from mill owners and from manufacturers. At least one new design should be on the market this year. General substitution of ball and roller bearings for the sleeve bearing has reduced outage time. Servo mechanisms on the saw shifters are well along in the development stages with the emphasis on hydraulic actuation.

Multiple trimmer saws still furnish a source of argument between the backers of mechanical, hydraulic and pneumatic actuating mechanisms.

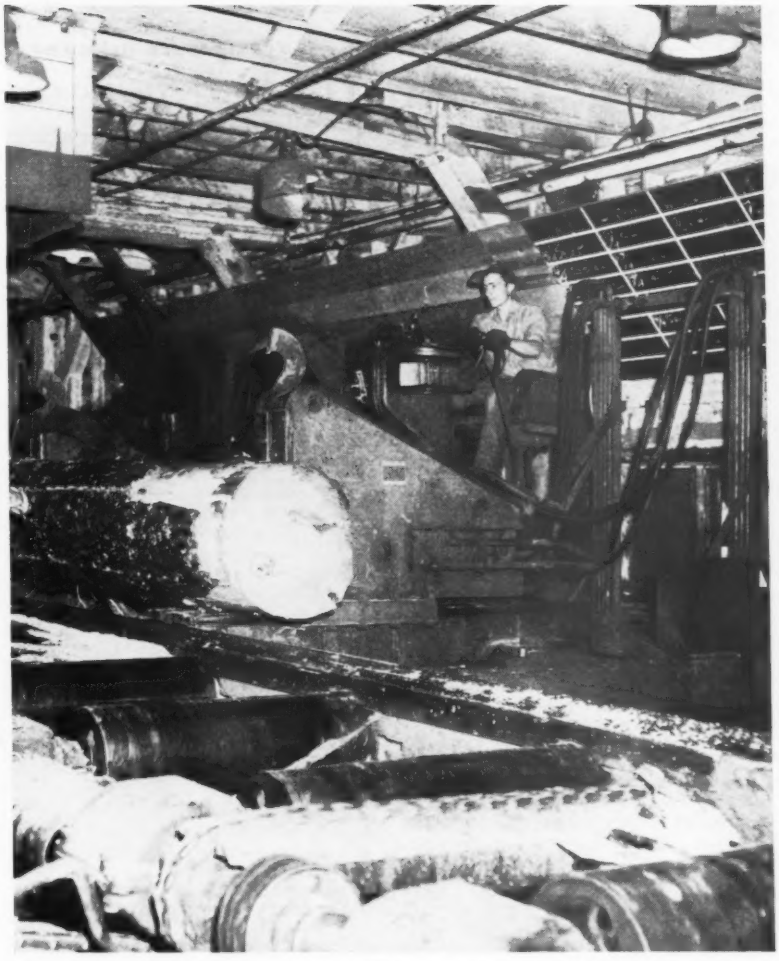
Need Better Saw Feeds

Band resaws are popular in both large and small mills, and have apparently received more attention from the designers than most sawmill equipment. Manually operated setworks are being replaced by hydraulically or pneumatically actuated ones. The resaw feed still entails a high labor cost and is due for constructive thought.

Dryer design remains static in the Western field. Dryer efficiency, however, has been increased by educating the operators to follow closely the steadily improving drying schedules, for which we are indebted to the industries' associations and to federal and state agencies.

Instruments, controls, fans and fan motors have been improved. Stackers and unstackers are now in general use with noticeable improvement to labor costs. The present drying system seems time-consuming and cumbersome, and offers a field for fundamental investigation.

Planers are becoming more general, due to customer demands, and have undergone improvement in knives and knife balancing. Feed tables are equipped with variable speed controls, among the most successful of which is an electric motor drive with a built-in eddy current clutch.



After mechanization. In this modern mill, instead of three men riding a sawmill carriage, one man in a comfortable leather chair does the same work by the "push button" method. Hose lines on carriage carry compressed air to mechanically operate "dogs."

Newly designed millwork equipment is on the market with attachments to increase flexibility of operation. From a recent survey of this branch of the industry, the need has been pressing as the present plants show a high degree of obsolescence. An even greater need, however, appears to be a study of process engineering and materials handling to increase efficiency and lower production costs.

Instrumentation Progress

During the war, development of control instruments was at a high peak but the results were not released to industry until some time afterward. Quality, capacity and range of the present control instrument are far superior to those of its predecessor. It is, however, difficult for the sawmill owner to keep up with these developments or with the increased number of applications. This is another job for the consulting industrial engineer.

One instrument developed recently for the wood-working industry is a continuous moisture detector operating on an electronic field principle. This detector can be used over an unusually wide range of moisture contents, has a widely variable maximum-minimum band and gives actuating impulses to marking devices, sorting mechanisms, etc. Its prototype has been in operation in a furniture plant for over a year. Another instrument developed for the woodworking industry is a timing-selector control operated by the grader for automatic sorting on the green chain, at the veneer dryer or at any other sorting station.

Metal detectors for use at the headrig have been put on the market, but they are expensive. Research engineers should develop a reasonably priced detector for logs and a smaller one for the feed belt to the hog.

Stationary magnets strategically placed in chip and refuse chutes and magnetic pulleys take good care of tramp iron in conveyor systems. No

means has yet been found to protect saws and hogs from rocks.

Materials Handling

This department of the woodworking industry shows little sign of improvement. The industry will do well to review the advances made in other industries in this field where the subjects of abrasion resistance, special metals and distributing systems have had intensive study. Speed control and synchronization are important. In woodworking plants, the telescoping portable conveyor installations could add much to process flexibility, reduced handling and lower production costs.

Quality Control

The statistical method of quality control is beginning to appear in the woodworking industry. In spite of the long-haired implications of its title, it has proven an easy, effective way of maintaining customer satisfaction.

Processes and Products

Upgrading of the common grades of lumber to clears by end and edge gluing has progressed little in the last few years. It needs the development of automatic or semi-automatic assembly systems as well as further development of continuous pressing equipment in order to reduce production costs.

Imitation shake siding in large panels, engineered for rapid application, has been put into production by the development of a semi-automatic assembly and gluing machine.

Several new wallboard and hardboard plants have gone into production or are in the construction stage, with two new principles involved. One comprises the incorporation of Douglas fir bark with the wood fiber in order to utilize the bonding and moisture resisting qualities of the wax present in the bark.

The second comprises the manufacture of a three-layer resin-bonded board, the two outer layers being composed of shavings, the inner layer of chips. At least one other process is in the development stage, differing in that the bonding resin is introduced while the fiber is in air suspension.

The wood hydrolysis plant at Springfield, Oregon, has successfully converted part of its percolation equipment to the extraction of wax from Douglas fir bark. It is now producing wood sugar solution by the original Madison process and concentrating it in multi-stage evaporators to a molasses for stock feed. Tank car shipments of this product have been made. With ethyl alcohol in increasingly short supply, plans are being made to reconvert to alcoholic fermentation and rectification of the spirits.

Three methods for the continuous carbonization of sawdust and other wood wastes are in the development stage. The charcoal will be sold in either briquette or pellet form.

Work on the manufacture of producer gas from wood waste for driving small gas turbines is in progress.

The redesign of boiler fireboxes and stokers is being investigated to increase the fuel value of wood waste.

Machines are welcomed, but trained operators still more

By MILTON H. MATER, Mater Machine Works, Corvallis, Oregon

TODAY, when an unskilled mill laborer takes home at least $3,000 a year, a labor saving machine can well pay for itself within a single year. Therefore, the sawmill equipment manufacturers have been offering labor saving devices to mill men. Sawmills have been, on the whole, receptive to this type of machinery and much of it is now available.

Many sawmills are already equipped with modern sawmill carriages which can be run by one man instead of three; with "drives"—to push the log-bearing carriage through the saw—which need little maintenance; and with countless other advances which cut down the work a man must do.

Many of the labor saving machines now in sawmills substitute hydraulic power, compressed air, or electric power for muscles, often all three. These sources of power make the modern sawmill look like a huge robot. By using these sources a 200-lb. man can sit in a leather covered chair and by pressing a series of buttons make a 10,000-lb. sawmill carriage perform with the ease and grace of a puppy.

Hydraulic power in the sawmill is responsible for cutting costs by replacing expensive steam installations. In moving the sawmill carriage, for instance, it was almost axiomatic that steam power be used. Steam meant that at least one steam engineer (a highly skilled man—and therefore a costly one) and usually a helper had to be employed for this one purpose. Now with the new hydraulic feeds, no special maintenance man is needed. In direct labor costs substitution of hydraulic power for steam saves a mill owner at least $5,000 a year.

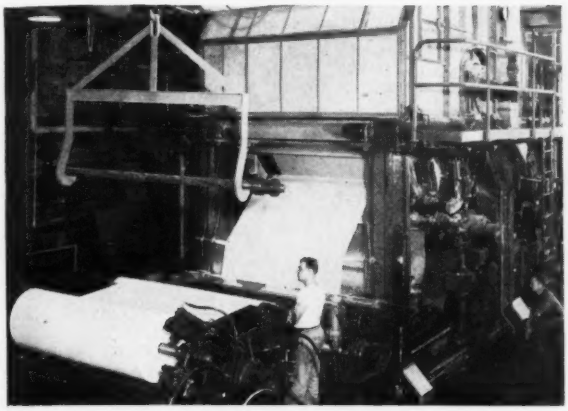
The greater use of compressed air provides the most recent advances in labor saving devices. With compressed air the "dogs" which hold the log on the carriage can be operated by a push button instead of by a strong man. This has resulted in taking "doggers" off the carriage. It is not unusual to see mills which had three or more men riding the carriage a few years ago, now operating with only one man.

Electricity is cutting corners in sawmill operation just as it is in every other industry. "Push button" control has become commonplace in the modern sawmill. Many mills which had only one 110-volt "house current" line coming into their mills for lights until a few years ago, now use complete industrial 440-volt electric panels, with the usual maze of lines common to industrial plants. Individual motors which start and stop at the flick of a switch have replaced the cumbersome long line shafts, belts, pulleys, idlers, and clutches of previous years. Self-synchronous motors have also been employed to transmit positioning data and even electronics have been used to control variable speed motor output.

Men in the sawmill field marvel at the rate of mechanization of their industry, but they say that the greatest strides in the use of labor saving machines will come when they have more men trained to use those machines.

Mechanical barker at Hammond Lumber Company, Eureka, California, barks redwood logs at the rate of 11,000 feet an hour, Humboldt Scale. Photo courtesy E. V. Prentice Co.

WESTERN PROCESSES AND PRODUCTS in Today's View



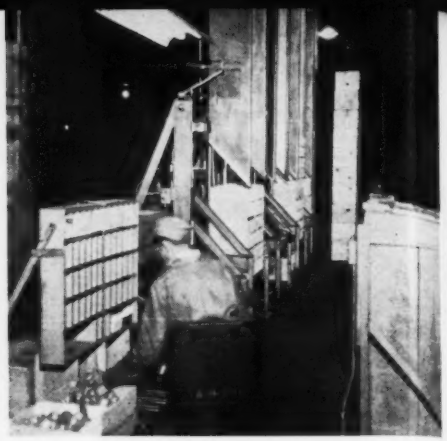
BELLINGHAM, WASH.—Rollers run 'round and 'round, and the paper comes out here. This is the dry end of a new papermaking machine installed at Pacific Coast Paper Mills of Washington, Inc. This is an interesting view of the end product.

SAN DIEGO, CALIF.—America's first turboprop transport, built by Consolidated Vultee Aircraft Corp. for Allison division of General Motors. Two 2,750-hp. Allison 501 turboprop engines power this modified 40-passenger commercial transport.

SAN FRANCISCO, CALIF.—This surplus Navy LCM has been converted to house four large steel tanks made at Consolidated Western Steel Corp. Tanks are rubber lined, used to transport waste industrial acid from Columbia Steel Co.'s Pittsburg, Calif., plant.

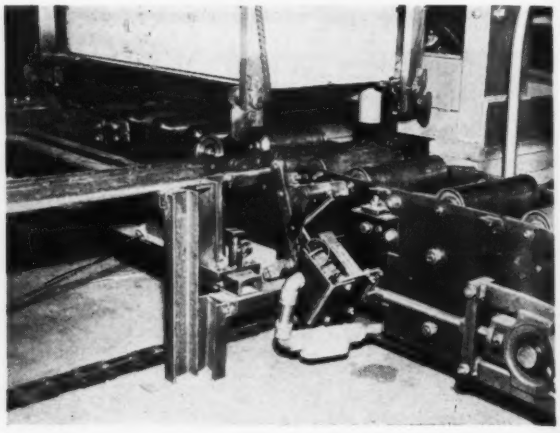
SUTTER CREEK, CALIF.—That's gold in that thar rock. Central Eureka Mining Co.'s engineers report that this vein may return $3,500,000 at the 3,900-foot level and above. This may be the richest strike in the area's history.

1. Boxes of lemons, on conveyor, are fed to these stackers



2. By one man who segregates them

3. And directs each box to its proper stack.



4. Full stacks are discharged to trucks by this . . .

Automatic box selector and stacker

STACKING BOXES or cartons as they come off a production line is enough of a labor problem in itself. But having to separate different types of items and stack them in like piles complicates the operation, increases labor costs and requires more floor area unless it can be done automatically by only one person and a machine.

Oxnard Citrus Corporation, Port Hueneme, California, had that problem: Packing Equipment division of Food Machinery and Chemical Corporation solved it by providing the machine for one-man operation.

PROBLEM: Segregation and stacking boxes of lemons before storing has long plagued the lemon packing industry.

Lemons, after being washed, are graded for color and packed loosely in boxes by hand. Then the boxes are stacked 10 or 11 high, and put into storage. Since the length of storage time is determined by the color (ripeness) of the lemons, each stack must contain boxes of similarly colored lemons.

Stacking those boxes by hand is a back-breaking job. Each box weighs about 75 lbs., and quite a number of men are required to handle 1,000 to 1,200 boxes per hour. Some serious accidents occur to personnel, and a lot of fruit damage results from hand operations.

By
EARLE McGRATH
Project Engineer
Food Machinery and Chemical Corporation
Packing Equipment Division
Riverside, Calif.

SOLUTION: A machine was designed to eliminate this production bottleneck. The general method of operation may be understood by referring to the accompanying pictures. Figures 1 and 2 show an actual installation of four stackers and a segregator, operating as a unit. One man operates the segregator to select boxes of four different colored lemons; these boxes are automatically stacked in like piles in the machine shown.

One-man Operation

Filled boxes approach the machine from the left, conveyed to it by a floor level live roll conveyor. At the point of selection, each box passes over a switch on the conveyor. At that moment, the operator determines the color and presses a corresponding button on his segregator panel.

The box then continues down the conveyor and, as it approaches the stacker for which it has been selected, a stop rises from the conveyor (see Figure 3) and halts progress of that box.

As the box butts up against this stop, it also trips a switch which energizes the stacker. Then the box is picked up automatically from the conveyor and carried up to where it is deposited on a retractable holding platform. (See Figure 4.)

Each stack continues to build up in this manner, with each box inserted from the bottom and raising the stack to a higher level.

Common-Sense Stacking

When the last box of the stack is picked up it is not carried into stacking position, but is raised only high enough to pick the rest of the stack off the retractable holding platform. Then the entire stack is gently lowered onto the conveyor.

At this point, the live rollers directly under the stack sink below the normal carrying level of the conveyor. That allows the stack to settle on the carrying surface of the floor type chain conveyor. That conveyor then carries the stack out of the machine at right angles to the production line conveyor.

Stacks are automatically spaced on the floor chain conveyor in pairs. Distance between two stacks in a pair is 1½". Distance between adjacent pairs of stacks is about 15". This area of separation makes handling and storage operations easy, because it allows special lift trucks to pick up a pair of stacks in one load.

24 Boxes a Minute

Boxes on the production line are fed into the machine at a maximum rate of 24 per minute. Boxes on the line are automatically spaced a box length apart before reaching the operator.

This separation permits a continuous flow through the machine while stacking in different piles. While a stacker is taking a box from the conveyor, the box immediately following can continue to travel. This machine is so designed and regulated for speed that the following box will not catch up with the one being stacked until the latter has been deposited in the stacker.

As the lifting dogs descend, they retract, allowing a free passage through the machine. (See Figure 5.)

The only time that flow is interrupted is while a stack is being discharged. That operation takes only about three seconds.

This segregator-stacker unit employs a "memory" system. As each box passes the color selection point, the operator merely presses a button, and from there on the job is done automatically. (See Figure 6.)

Railroad Block System

The system designed for this machine permits boxes to be blocked on one part of the conveyor, while the flow continues on another part of the conveyor.

For example, if the second stacker in the line is discharging a load, a box headed for the third stacker is automatically blocked ahead of No. 2. But a box going to the first stacker in the line is permitted to enter that stacker, and any boxes on the conveyor that have passed stacker No. 2 and that are directed to stackers No. 3 and No. 4 at the time that stacker No. 2 is discharging, are also allowed to continue to their respective stacker destinations.

Actually the memory device is a position indicator system. It employs switches along the conveyor line at specified intervals: those switches record the position of each box through a set of interlocking relays.

A system of automatic stops is also incorporated to keep the boxes at a specified distance from each other in case several boxes are blocked during the discharge of any stack.

Stackers are hydraulically operated. A single acting piston and a simple hydraulic circuit elevate and lower the carriage that handles the lifting dogs.

Added Advantages

Several unforeseen advantages of this automatic unit appeared after the first installation had been in operation for a while. This automatic unit handles the fruit much more gently than the men used to, and damage became noticeably less. Stacks are now straighter and more uniform than before, and a result of that is better air circulation in storage. Better color selection is now obtained, since it is under control of only one skilled man.

This system of stacking and/or segregating can be used, of course, with any uniformly boxed product.

In most cases, stacking machines have cut the cost of the stacking operation 65 to 75%. They effect a manpower saving of (in some cases) 32 man hours per day. They stack three to four times faster than was formerly done by hand.

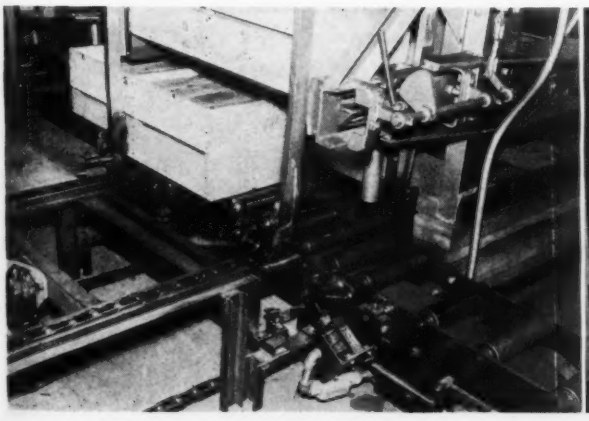
No Limit

There is no theoretical limit to the number of stackers that can be used in a single installation. Any one stacker can tolerate only small variations in the boxes that it handles, but the installation can be made to handle a wide variety of sizes, each size box going to a particular stacker.

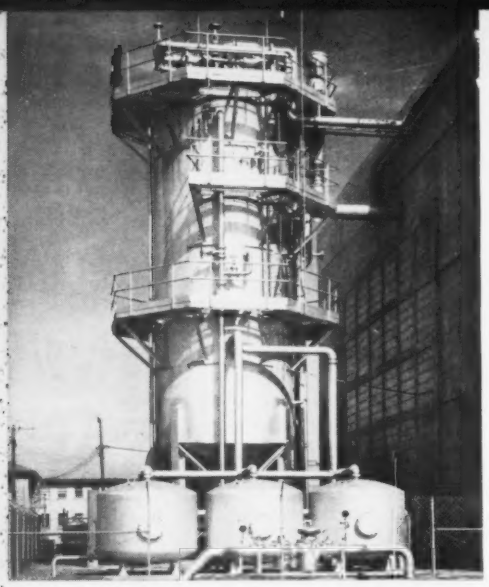
Food Machinery and Chemical Corporation made all of the conveyors. The only equipment purchased on the open market were such components as electrical parts (relays, motors, etc.), hydraulic pumps and valves, ball bearings, belts, etc.

These machines were designed by the author and E. A. Verrinder, chief engineer of FMC's Packing Equipment Division.

5. Boxes are inserted into stacks from bottom.



6. After color is selected, process is automatic.



Hot lime-soda softener installed in San Francisco Naval Shipyard, Hunter's Point.

Third in a series on water problems

Be sure to treat your water for what ails it

By RAY W. HAWKSLEY, Chemical Engineer, San Francisco, Calif.

AN ALMOST bewildering number of different methods of water treatment are used for changing the characteristics of the raw water to achieve a more favorable chemical composition.

It is convenient to differentiate between "external" and "internal" treatments. By external treatment is meant processing the water in a separate unit, ahead of its end use. This always involves a piece of equipment of some kind. Internal treatment is a method of chemical correction or control by the use of additive chemicals, employed inside a boiler, for example.

Impurities in water may be broadly classified as follows:

1. Undesirable gases, such as hydrogen sulfide, free carbon dioxide, and excess chlorine.
2. Undesirable tastes and odors.
3. Iron and manganese.
4. Suspended insoluble matter which creates turbid water, such as mud or silt.
5. Dangerous bacteria.
6. Hardness.
7. Silica.
8. Occasionally, acids or oils.

We will discuss briefly below the broad fields of application of a number of external treatment methods for the removal of various of these impurities, reserving the discussion of internal treatment for a later article.

The first two installments of this series of articles on Pacific Coast waters, appearing in the November and December issues, dealt with the industrial qualities involved, and included a tabulation of water characteristics in a large number of Western cities.

This third installment discusses methods of water treatment.

As the March issue of *Western Industry* is a special metals number, the fourth installment will appear in the April issue. It will be devoted to water treatment.

The fifth installment will deal with water conservation.

Aeration

Aeration is a process of intimately admixing water and air, in order to establish equilibrium between gases dissolved in the water, and those normally present in the atmosphere.

The usual equipment for aeration is a tank filled with baffles, over which the water is sprayed. Forced circulation of air is often provided.

Aeration tends to remove undesirable gases, and often improves taste and odor. Due to the saturation of the water with atmospheric oxygen, ferrous iron and manganous manganese in solution are oxydized, and largely removed.

Subsidence

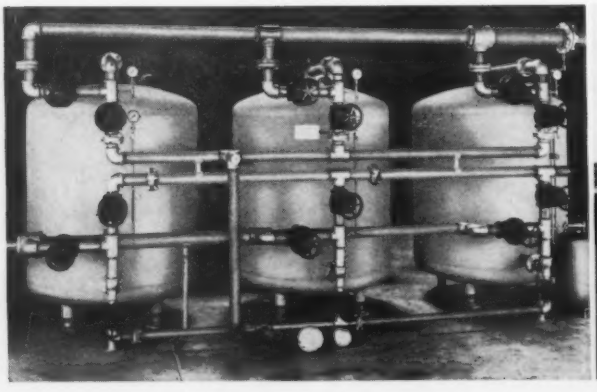
Subsidence is settling out of suspended substances from water, in ponds or settling basins. The efficiency of the process depends almost entirely on the density and size of the particles, and on the retention time available.

Simple settling of this kind is often used, where space is available, to take some of the load off filter equipment. Turbidity is removed by this means up to as much as 80%. A secondary effect is that bacteria are removed, in roughly the same degree as turbidity.

Coagulation

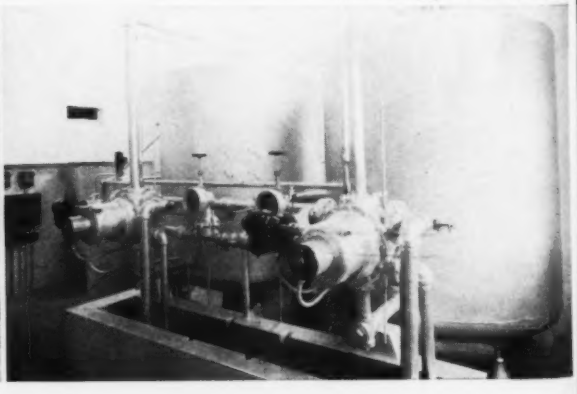
Coagulation is the process whereby finely divided particles are combined by chemical means into masses sufficiently large to settle rapidly, or be retained on a filter bed more effectively. The coagulating agents most

Zeolite softener at an army air field, Southern California.



Battery of three sand pressure filters in a state institution.

Photos courtesy A. C. Lo Prest Co.



CORRECT SPECIFICATION

is part of the picture

Revere Admiralty Metal Tubes in a heat exchanger fabricated by the Nooter Corporation, St. Louis, Mo.

● This heat exchanger, fabricated by the Nooter Corporation, St. Louis, Mo., contains Revere Admiralty Metal Tubes. They were specified after a thorough study of operating conditions indicated that they would be the most satisfactory. Though Revere Admiralty Metal Tubes are generally considered to be acceptable under a relatively wide range of conditions, and are bought in such large quantities as to warrant the term "popular," they are by no means all-purpose tubes. In fact, there is no one tube alloy that can be called "best," because condenser and heat exchanger installations vary so greatly in their requirements.

In order to meet these differences, Revere does two things; it makes condenser tubes in a number of different alloys, and it collaborates with its customers, through the Revere Technical Advisory Service, in specifying the alloy most likely to meet individual service requirements.

Among the Revere Condenser Tube Alloys are: Admiralty Metal, Arsenical Copper, Muntz Metal, Aluminum Brass, Aluminum Bronze, Cupro-Nickel. Revere also supplies tube plates in a variety of alloys. If you have any questions regarding the selection of tubes or plates for condensers and heat exchangers, consult Revere.

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*This hose is known as PIONEER **"PYLON"** spray hose. It has a single Nylon braid, and oil and chemical resisting synthetic rubber tube and cover. **"PYLON"** spray hose is made in all usual sizes.

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The effect of various water treatments

Conditions are assumed average for the West. No change is indicated by 0; increase, +; decrease, —; may increase, +*.

	Hardness	Alkalinity	Chlorides	Sulfates	Silica	Total Diss. Solids	Iron	Turbidity	pH
Aeration	0	+	0	0	0	0	—	0	+
Subsidence	0	+	0	0	0	0	—	—	+
Coagulation with alum	0	—	0	+	0	0	—	—	—
Coagulation with sodium aluminate	—	+	0	0	—	0	—	—	+
Coagulation with ferrous sulfate	0	—	0	+	—	+	—	—	—
Coagulation with magnesium oxide	0	+	0	0	—	—	—	—	+
Filtration with sand	0	0	0	0	+	+	0	—	0
Filtration with anthracite	0	0	0	0	0	0	0	—	0
Chlorination	0	—	+	0	0	+	—	—	—
Sodium zeolite	—	0	0	0	0	+*	—	—	0
Sodium zeolite plus acid	—	—	0	+	0	+	—	—	—
Hydrogen zeolite plus sodium zeolite	—	—	0	+	0	—	—	—	—
Hydrogen zeolite plus caustic	—	+	0	+	0	+	—	—	+
Demineralization, strongly basic anion	—	—	—	—	—	—	—	—	—
Hot lime-soda	—	+	0	0	—	—	—	—	+
Hot lime-soda plus hot phosphate	—	+	0	0	—	—	—	—	+
Hot lime-soda plus hot sodium zeolite	—	+	0	0	—	—	—	—	+
Hot phosphate	—	+	0	0	—	—	—	—	+
Cold lime-soda	—	+	0	0	—	—	—	—	+
Cold lime-soda plus acid	—	—	0	+	—	+	—	—	—
Cold lime-soda plus sodium zeolite	—	+	0	0	—	—	—	—	+

commonly used are alum, copperas (ferrous sulfate), various ferric salts, and magnesium oxide. Which of them is most suitable for a particular water usually requires special study.

Filtration

Filtration is a purely mechanical process, wherein water containing suspended insoluble matter is passed through a bed of sand or other porous material, which removes the suspended particles. The process is essentially one of straining or screening.

For industrial uses, the "pressure filter" is usually employed. This type of filter consists of a closed tank, either vertical or horizontal, which contains the filter medium, supported by a bed of gravel. The water to be filtered is forced through this unit under line pressure at a controlled rate. When the head loss through the unit reaches a certain value (indicating that the filter has become loaded with silt), the unit is "backwashed." This consists of reversing the flow, and washing the silt out of the filter bed, of course discharging the washings to waste.

Coagulation greatly aids the filtering process, producing a clearer effluent.

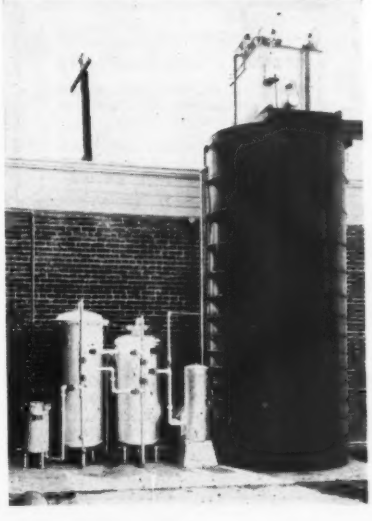
Chlorination

Gaseous chlorine or chlorine compounds, such as hypochlorites, are widely used for sterilizing water. Industrially, chlorination is of importance in the control of algae and slime in cooling water systems. Most municipal water supplies are treated with chlorine for sanitary reasons.

Sodium Zeolite Softener

This unit consists of a closed tank, packed with zeolite material, through which the hard water is passed. This equipment removes calcium and magnesium from the water, substituting sodium for these elements. It is regenerated or revived with a brine of common salt, when its cyclic capacity for softening has been reached.

Cold lime-soda softener (right), followed in turn by coagulent feeder, sand pressure filter, and activated carbon filter, installation in a soft drink bottling plant.



The first "zeolites" were minerals occurring in nature, but resinous materials have been synthesized which have so far improved on the natural material that they are rapidly displacing it.

Zeolite softeners have a distinct application in any process where soft water is an advantage. Laundries find a decided use for them in reducing soap consumption, and they are widely used for softening domestic water supplies. In boiler water conditioning, zeolite softeners are often used to remove hardness before the water enters the boiler, thus reducing scale formation.

Zeolite softeners should not be used until an investigation of the particular problem indicates that it is the most applicable treatment. Many installations of this type have been made on the assumption that it would cure all evils regardless of their character, only to find that some other method of softening would have been far more applicable to the problem in hand.

These zeolite softeners are not very troublesome to operate. In fact, they are quite simple. Very little in the way of testing is required, and any operator of average intelligence can be taught to operate them. Because of this simplicity, however, many zeolite softeners have been installed to operate on waters entirely unsuited for their use.

The zeolite softener has definite limitations for the treatment of boiler feedwater. It will efficiently remove hardness, but has no effect on alkalinity, and does not remove silica. It is by no means the answer to all feedwater problems.

Where hardness is low, the use of a zeolite softener is not economically justified, because scaling of the boiler can be done at lower cost by internal treatment techniques. If the hardness is very high, treatment with lime in either the cold or hot process, is often more economical.

Whether the zeolite process should or should not be used in any individual case can only be judged following an investigation of all of the factors involved. In general, the zeolite process finds its best application with waters of moderately high *permanent* hardness, medium alkalinity, and low silica.

Sodium Zeolite Plus Acid

Where the raw water has a high alkalinity, the effluent from a sodium zeolite softener is often treated with sulfuric acid to reduce alkalinity to desirable limits. This involves the use

of accurate acid proportioning equipment, and requires rather careful control.

Hydrogen Zeolite Softener

In this process, sulfuric acid is usually employed as the regenerant. There is removal of calcium, magnesium and sodium from the raw water, and hydrogen is substituted. The result of this is that calcium, magnesium and sodium chlorides, sulfates, carbonates, etc., are changed to their corresponding acids, and the effluent from a hydrogen zeolite unit is therefore strongly acid.

Of course, such acid water is unsuited for boiler feedwater, without further correction. Quite often the acid effluent is blended with more raw untreated water, in such proportion as to achieve the desired alkalinity in the mixture. The mixture will then have a certain amount of hardness, coming from the hardness of the raw water used in blending.

To overcome this, if the resulting hardness is objectionably high, the effluent from a separately operated sodium zeolite softener can be used for blending. The resulting mixture will then be dead soft, with alkalinity at any desired value depending on the proportions used. Or caustic soda can be added to the hydrogen zeolite effluent for the purpose of neutralizing the excess acidity.

Demineralization

A relatively recent development in water treatment is the use of synthetic exchange resins, similar to zeolites, in the "anion-cation exchange" or "demineralization" process. In its elements, the process consists of a hydrogen zeolite unit as the first step. In this part of the process, all cations, or positively charged ions, such as calcium, magnesium, sodium, etc., are retained, and the effluent contains their corresponding acids. Next, the acidic product is passed through an acid adsorbing unit loosely called an "anion exchanger."

The anion exchanger adsorbs acids, with the result that substantially all of the impurities are removed from the water, and the product is the equivalent of commercial distilled water.

While this process produces an extremely pure water, the cost is higher than justified for most industrial uses. It is substantially cheaper than distillation, however. Demineralization requires more careful control than many other softening processes, and also involves the handling of sulfuric acid and caustic soda.

Lime-Soda Softeners

Lime-soda (hydrated lime and soda ash) softeners may be either cold process or hot process. This method is employed for the removal of hardness in order to prevent scale and sludge in boilers, and in general to remove hardness. Incidental to the removal of hardness, proper operation will also largely remove iron, free carbon dioxide, turbidity, and silica.

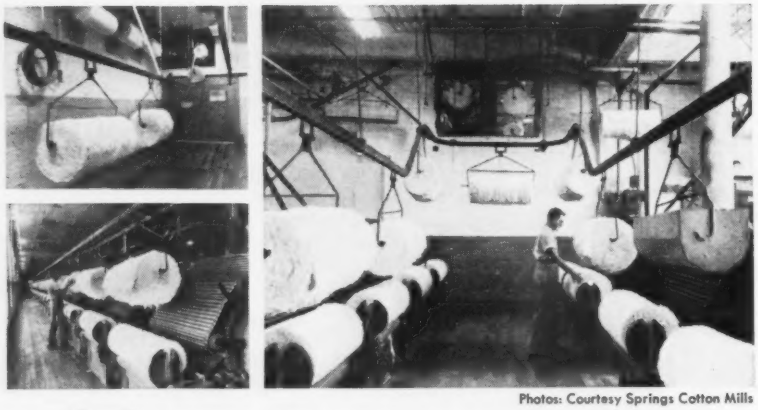
This type softener requires more careful control than a sodium zeolite softener, but when operated hot, will reduce hardness to about one grain per gallon. The cold process will not ordinarily reduce hardness below three grains per gallon.

This process should be used for waters of high hardness, high carbonate alkalinity, and high silica. A marked reduction in total solids content can be effected where the raw water contains high temporary hardness. Since many West Coast waters are of this nature, the use of the lime soda process should always be given consideration.

Comparison of Treatment Methods

The table on page 43 shows briefly and qualitatively the changes each process will make in the quality of the incoming water, under average conditions.

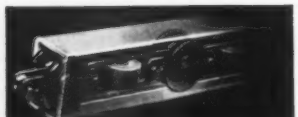
RAISE production...LOWER costs



Photos: Courtesy Springs Cotton Mills

with "Zig-Zag" Continuous Power Conveyors

Here you see how "Zig-Zag" solves a complex handling problem in the Springs Cotton Mills at Lancaster, South Carolina. In almost every imaginable industry, R-W "Zig-Zag" Conveyors are serving production and processing lines—increasing efficiency, cutting costs. Specifically designed to carry light loads through confined or crowded areas, "Zig-Zag" is adaptable to almost every plant condition or layout. And the savings effected with R-W "Zig-Zag" Conveyors are so substantial, the equipment pays for itself quickly—in most cases in less than a year! For further information, call, write, or wire our nearest office.



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- Complete flexibility for installation in any plant. Easily installed, easily changeable to conform to plant alterations.
- SAFE—all moving parts are fully enclosed.
- Low first costs. Low Power Factor.
- Standard horizontal or vertical curves —two-foot radius.

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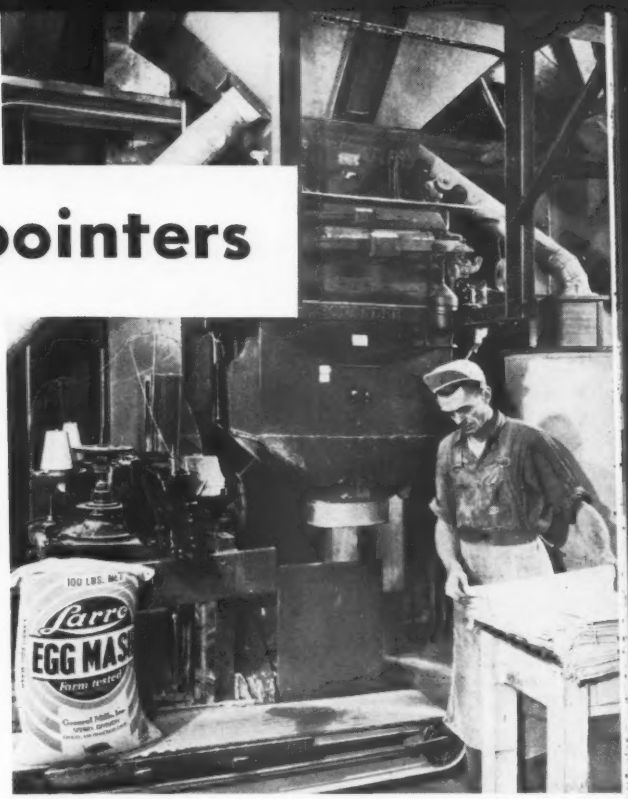
ELEVATOR DOOR OPERATING EQUIPMENT

Paper packaging pointers

Air duct relieves dust; no answer to folding problem; crepe finish prevents slipping; flattening rolls desirable; trained men vital



Trend is toward paper containers for pellets, crumbles, and other formula feeds, but the automatic packer shown here is equally adaptable to use with cotton or burlap.

QUITE LIKELY various industries have the same problem of putting their products in more attractive, competitive packages that we in the formula feed group have today.

The trend is definitely toward paper. But paper packaging itself poses several problems to the mill operator, to maintain or exceed the efficiency level that is considered standard with cotton or burlap bags.

Many of the benefits of the paper package are lost when papers are packed on the present equipment in most mills today. The auger type packer that is quite common in many packaging departments is a good machine when used for the purpose that it was intended, but it is not suited for practical paper packaging. It is comparatively slow and awkward. The packing tube on this type of packer is not all conducive to efficiency.

There is no doubt that the old packer is rapidly becoming obsolescent, but then, there will always be a few millers who will try to do the job with what they have, not considering how much it is adding to their packing costs.

Suction for Dust

One type of packer that raises the efficiency of paper packing over the auger type packer is the automatic scales packer. One point to be considered regarding dump scales is to obtain adequate suction near the bag spout, to relieve the dust that is forced from the paper bags as the feed is dumped into it. This in itself can be corrected with the installation of an air duct properly placed at the top of the bag while in filling position on the packing tube.

By
L. E. ABBOTT
Feed Milling Superintendent
General Mills, Inc.
Tacoma, Wash.

Closing Problems

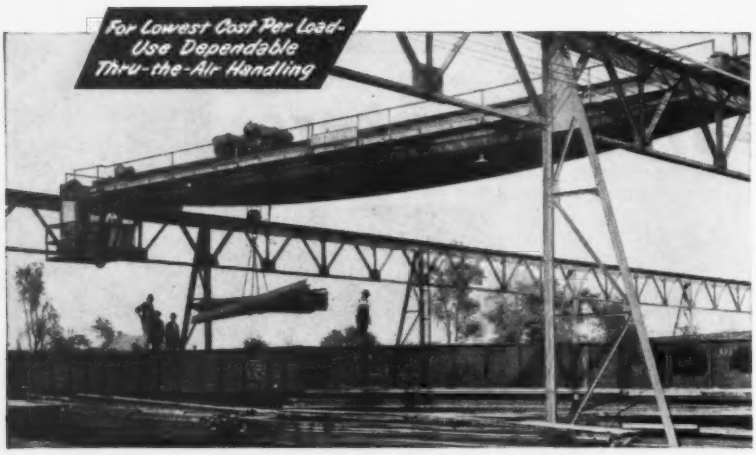
Another point is that it has been found necessary to use a larger bag to accommodate the feed, regardless of the use of any other type of mechanism or mechanical packing aid. Nevertheless, it is an economical approach to paper packaging and it is possible that until better or more efficient machinery is developed, the feed industry may have to find a partial solution to its paper problems in this type of packer.

Closing the bag raises many problems. The sewing heads in common use today were not built for paper packaging and it is useless to expect them to do a good job on something for which they were not intended. The process of preparing the top of a paper bag can prevent a sewing head from functioning correctly. Paper bags consist of six to eight thicknesses of paper and if these layers are not folded straight and correctly, prior to entry in the sewing head, the sewing machine dogs have a tendency to bunch and crumble the paper, making sewing an impossibility.

There is no like procedure in the closure of burlap or cotton bags and it is a definite factor in the decreased production of paper packages per man hour. There are adequate closing machines to be had at the present time but the preparatory step of folding cannot be eliminated as yet. No doubt someone will provide an answer.

Crepe Stops Slipping

The smooth finished layer of paper commonly used on the exterior of bags often results in a bag that slips and slides while in storage and in general is difficult to handle. The paper industry now has produced a crepe finish outer layer with sufficient strength to stand the wear and tear of storage and shipment. The paper industry itself is to be commended for the fine effort it has made toward solv-

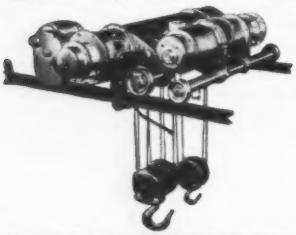


This installation required built-up plate, welded box construction . . . fish-belly design . . . enclosed cab . . . complete weatherproofing . . . main and auxiliary hoist units (see illustration below)

How to get the most CRANE for your money

When you buy a crane, make sure you select the machine best qualified to do *your* job! The work for a crane in your plant probably differs from that in your neighbor's plant. The general crane rating and other details which are perfect for his handling problems may not be at all suitable for yours. To get the most crane for your money, let *crane duty* determine *your* choice.

It isn't entirely a matter of capacity. Travel speeds, hoisting speeds, frequency of use—all call for special consideration in the choice of a crane. That's why it's wise to discuss your problem with a Shepard Niles specialist. It's much less costly to install the *right* equipment in the beginning — than to make important changes later.



MAIN AND AUXILIARY HOISTING UNIT—Recommended for duty where there is a wide range in the capacity handled. Auxiliary hoist handles lighter loads at greater speeds than can be obtained with the main hoist.

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SAN FRANCISCO: STRYCO MANUFACTURING COMPANY
470 Natoma Street, San Francisco 3, California—Mr. R. C. Arquette

SEATTLE: PRESTON FALLER COMPANY
1921 Minor Avenue, Seattle 1, Washington—Mr. Preston Faller

ing the problems of efficiency in economical formula feed packaging.

Another piece of equipment that has been found necessary in the packing of feeds in paper is the flattening roll. It is often necessary, particularly on some feeds, to flatten filled bags for proper handling and storage. Pellets, scratch grains, and crumblized feeds are more or less self-flattening and will not need to be passed through the rolls, but soft feeds need special attention.

Training Job Faced

The training of personnel is a most important function to review. All the mechanical improvements that can be devised will not amount to much without the proper training of personnel. There is much to be done in this field because a different technique is necessary in handling papers as compared to cotton and burlap. This is possibly a matter for the individual foreman to be concerned with but, nevertheless, it is a factor in the efficient, economical production of competitive paper package.

Trend Toward Paper

In the past we have seen mashes, dairy feeds, pellets, crumbles, molasses feed and scratch feeds packed predominantly in burlap and cotton in 100-lb. packages. We are today seeing and will continue to see mashes packed in 100-lb., 50 and 25's and 10-lb. paper containers. Other feeds, such as dairy, pellets, crumbles and scratches are also wanted in paper containers by the customer. The trend is definitely toward paper containers in feed packaging.

Development Work Needed

The formula feed industry has attempted to follow in the flour industry's path as far as large packaging is concerned, but a new era of packaging has opened for formula feeds and we must strike out on our own. We must develop machinery and equipment necessary and especially suited for its own needs and purposes. The trend is toward papers, large and small, but the feed industry will not be equipped to handle papers economically and efficiently until the proper equipment is installed. We have every right to expect a fully automatic packing system such as is used in certain packages in the flour industry. With intelligent effort, the solution will come.

Correction—

AS THE RESULT of a transposed numeral, the number of Willys-Overland station wagons assembled at Los Angeles last year was incorrectly reported in the January 1951 *Western Industry* as 2,693. The number should have been shown as 2,963.

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TECHNICAL SHORTS

Smoke Washer for Gray Iron Foundries Tested

A CUSTOM-BUILT smoke washing device designed to combat smog caused by gray iron foundries is presently under initial test at Apex Steel Corp., 6111 Eastern Ave., Los Angeles. Forty-two gray iron foundries are cooperating in an $80,000 research project toward smog elimination.

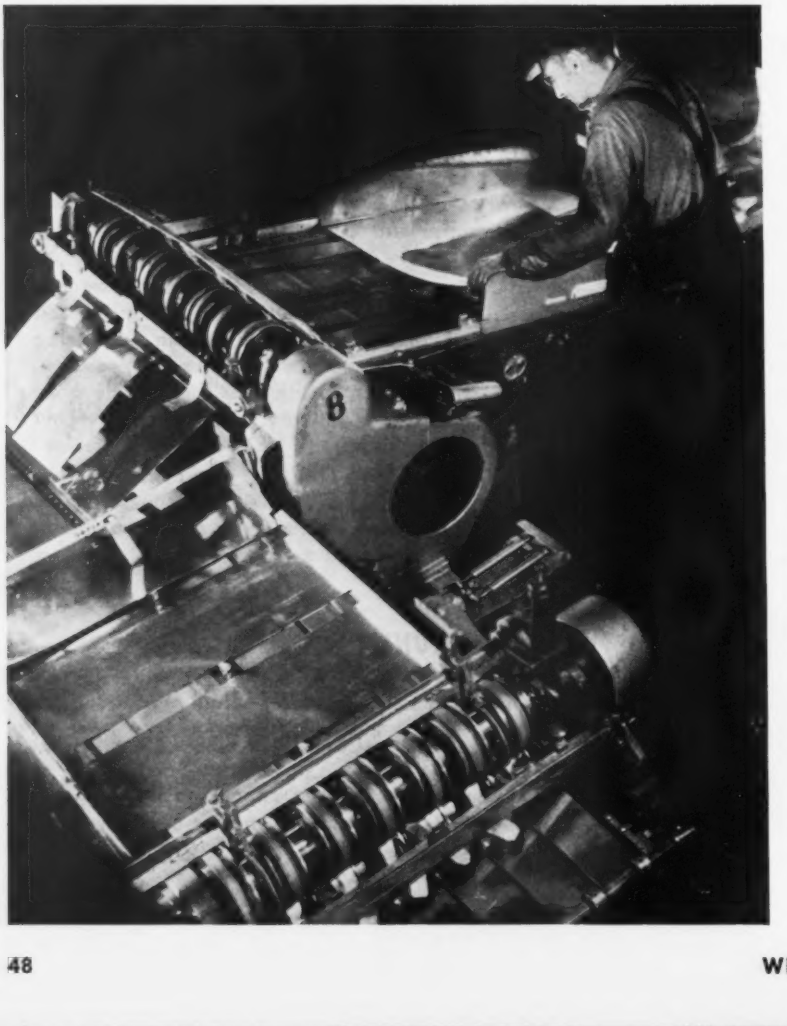
Ordinarily a cupola emits mostly relatively heavy cinders or ash, which fall immediately to earth. In addition, small quantities of minute particles go into the air. Minute emissions of the previously recoverable type blamed for smog were estimated to total not more than 1-1¼ tons per day for all Los Angeles gray-iron foundries.

Scientists state that the particles that remain suspended in the air constitute the cause of smog conditions.

Development of this massive "wet-type scrubber and bag house" necessary to hold emissions to the prescribed minimum culminates more than two and one-half years of study, research and experiment, according to D. L. Robertson, administrative chairman of the sponsoring Gray-Iron Foundry Smog Committee.

Working with Robertson are J. Edward I'Anson, general chairman, and C. J. Bradley, technical chairman. The committee, now operating independently after being first organized by Los Angeles Chamber of Commerce in 1948, embraces companies pouring more than 90% of all gray-iron tonnage in the country.

Less tin this year but we still have to have cans and the contents will taste just exactly the same. This slitter cuts blanks for can bodies out of rectangular sheets of tin plate by means of two sets of rotating shears. Photo courtesy American Can Co.



How Would You Do It? An Engineer Teaser

THIS PROBLEM concerns a Western woodworking plant that is experiencing trouble in small bin storage.

"We are constructing a new boiler fuel bin," they write. "This bin will be 20 feet wide, 40 feet long and 35 feet deep. It will have a V-bottom of 45 degrees, sloping from each side into a central conveyor.

"This fuel bin will store a combination of planer shavings and sawdust, a rather fluffy mixture of wood waste. Properties of that combination are such that it is inclined to "tunnel out" over the top of the conveyor, and decrease the discharge flow of the fuel.

"When that happens, our boiler firemen have to enter the interior of the bin and break it down into the conveyor. Two of our employees have very nearly lost their lives when cave-ins occurred inside our old bin, and we are seeking to eliminate this risk.

"Obviously, some mechanical arrangement is necessary to break this fluffy fuel down into the conveyor. Yet, on the other hand, we do not want anything more than the very minimum apparatus inside the bin, since this fuel has a decided tendency to 'hang up' on rods, etc.

"A regular bin vibrator would not work here because the heavily timber-braced two-inch thick metal sheathed wooden floor of this bin is too heavy to shake or vibrate."

Who can suggest a solution to this one? Write editor, *Western Industry*.

Aircraft Development Can Go Too Far

FOR YEARS, aircraft engineers have been striving to take the vibration out of things that fly. They have more than accomplished their purpose. Now, they find, they have made the planes so smooth in flight that the instruments won't work properly. So they designed a device to induce artificial vibration and keep the planes on an even keel.

In the case of the B-47 Stratojet, for example, jet power practically eliminates vibration from the instrument panel. As a result, low-torque instruments such as the air speed indicator and the altimeter develop gear friction and consequent lag; they give improper readings.

Engineers then produced an 11-ounce artificial vibrating unit that shakes the instrument panel just the right amount, preserving instrument readings while leaving the rest of the plane in smooth flight.

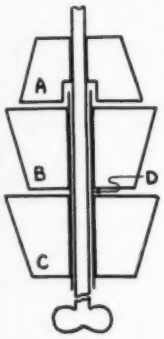
Better Than Mercury Seated Stirrers

A GLYCERINE-SEALED mechanical stirrer has been devised, which may be made from parts readily obtainable in any chemical laboratory—a piece of glass tubing, and three rubber stoppers.

Announcement of this new device is made by Henry Y. Lew of Stanford University, who developed it to overcome the disadvantages of mercury-sealed mechanical stirrers.

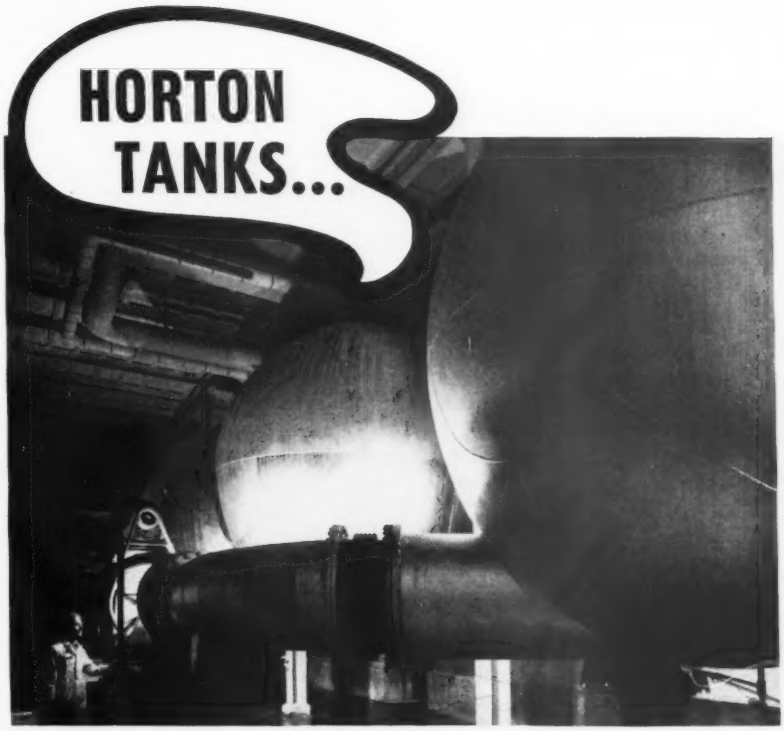
"Mercury," says Mr. Lew, "is always a nuisance to handle and exposure to it is detrimental to a person's health. Furthermore, for chemical reactions in which halogens or halogen acids are present, the mercury usually reacts with the halogens or halogen acids.

"Although the use of mercury-sealed mechanical stirrers is almost universal in chemistry laboratories, they have disadvantages that we have tried to eliminate, and we have worked out the following method:



"Stopper B is size 4 or 5 and stopper C of the proper size to fit the flask. Tubing D is fitted tightly to stoppers B and C and extended 5 mm. above B, forming a wall to prevent access of glycerine to the stirrer shaft. Stopper A is one size smaller than stopper B and is bored to a depth of about 7 mm. with a cork borer whose diameter is about 3 mm. larger than of tubing D. The core is cut out with a pair of scissors. The stirrer is passed through D and then through the tightly fitting stopper A for such a distance that when stopper A rests on stopper B the stirrer is at the desired level in the flask. The surfaces between stoppers A and B are lubricated and sealed with glycerine.

"This seal has several advantages over a glycerine-lubricated sleeve of rubber tubing. It is not necessary to find rubber tubing and glass rod of the proper size for a close fit, and there is less danger of contamination of the reaction mixture with glycerine. It has the advantage over the reservoir type of glycerine-sealed stirrer in that it is simpler and less cumbersome to manipulate. The same seal may be used for flasks of different sizes simply by interchanging stopper C to fit each flask."



Help Solve An Old Riddle

The eighty-year-old problem of recovering process chemicals and using the organic materials dissolved out of the wood chips in the sulphite pulping process, is at last being solved. And what's more, the solution may also mean the end of stream pollution.

In the new Weyerhauser Timber Company's plant at Longview, Washington, years of research on the problem are being put into practice. A sulphite recovery process has been developed to recover chemicals from liquors used in production of sulphite pulp, and to produce electrical energy and steam from organic materials in the liquors.

Looking like something from Mars are the four welded steel dump chests, shown above, that are used in this process. These balloon-like structures were fabricated and erected by the Chicago Bridge and Iron Company to receive pulp coming from the digesters. Inside, they are protected by acid-resisting linings. Each of the four 16-ft. diam. by 71-ft. chests is supported by two ring girders spaced 37 feet apart. The base of one girder on each vessel is fixed, the other moves as the shell expands and contracts. Each tank also has a 40-in. pipe connection attached to both sides, and one 8-in. and one 20-in. nozzle at the top.

These dump chests are another example of the specialized steel plate work we are doing for Industry.

Write our nearest office for estimates the next time you need steel plate structures of any type.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2144 Healey Building
Birmingham 1.....1560 North 50th Street
Boston 10.....1065—201 Devonshire Street
Chicago 4.....2132 McCormick Building
Cleveland 15.....2256 Guildhall Building
Detroit 26.....1567 Lafayette Building
Houston 2.....2164 National Standard Building
Los Angeles 14.....1570 General Petroleum Building
New York 6.....3334—165 Broadway Building
Philadelphia 3.....1666—1700 Walnut Street Building
Salt Lake City 4.....568 West 17th South Street
San Francisco 4.....1578—200 Bush Street
Seattle 1.....1369 Henry Building
Tulsa 3.....1667 Hunt Building

Plants in: BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

Tool and Die Steel Qualifications

"INDUSTRY is based on the development of tool steels. With the wide variety of tooling needs, many characteristics are required for different jobs. Often tool steels are 'tailor made' for particular applications." So goes the idea expressed by Dr. Stewart Fletcher, chief metallurgist of Latrobe Electric Steel Co., Latrobe, Pa., at the Puget Sound chapter of American Society for Metals October meeting.

The six basic types of tool and die steel and some of their characteristics are summarized in the following table.

Steel	*Cost*	*Machinability*	*Cold Performance Shock*	*Cold Performance Cutting*	*Hot Performance Shock*	*Hot Performance Cutting*	*Heat Treat.*
Carbon (W.H.)	Lowest	Best	Good	Good	Poor	Poorest	Easiest
Oil Hardening	Low	Good	Good	Good	Poor	Poor	Easy
Air Hardening	Medium	Poor	Best	Good	Poor	Fair	Easy
Shock Resistant	Low	Good	Best	Poor	Fair	Poor	Medium
Hot Work Die	High	Fair	Poor	Poorest	Best	Poor	Hard
High Speed	Highest	Poorest	Poor	Best	Fair	Best	Hardest

Heat treatability is a determining factor in tool steel selection. Carbon steel hardens to a narrow depth which leaves the core soft and tough. Oil hardening, or the so-called manganese non-deforming steels, are used to prevent change in size on heat treating. The air hardening steels are very safe to heat treat because of little or no cracking or distortion. The high speed tool steels require high temperature and close control and at times are hard to handle.

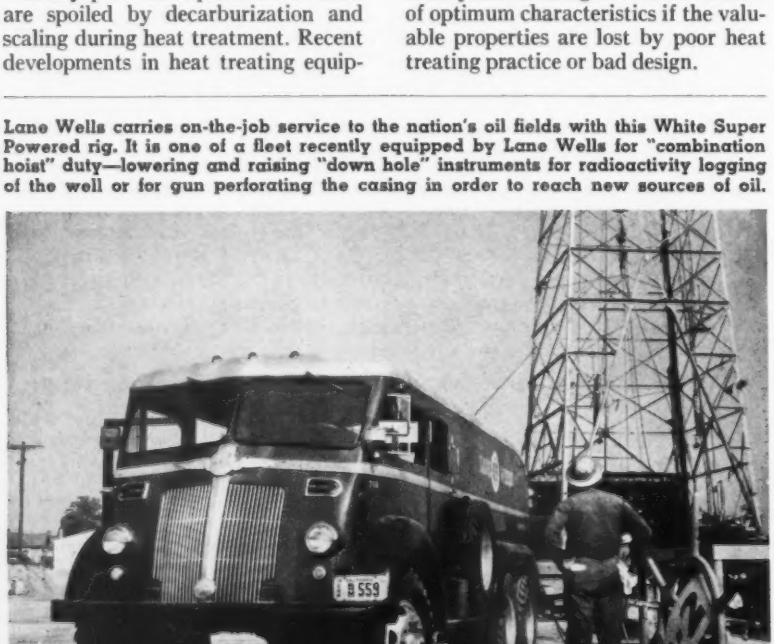
Many parts of expensive tool steel are spoiled by decarburization and scaling during heat treatment. Recent developments in heat treating equipment have produced hardening furnaces with closely controlled atmospheres. The electrically heated salt bath is an excellent method of heat treatment since the surface of the part is protected by the salt. Of all tools made from high speed tool steel, 40 to 50 per cent are heat treated and quenched in salt baths.

Poor heat treatment is not the only factor that defeats the purpose of tool steel. Of cracked tools and dies, 60 to 70 per cent are the result of errors in design. When designing tools, the 4 per cent volume change from austenite to martensite must be considered since this volume change causes high internal stresses. Sharp corners or sudden changes in section thickness offer stress risers, and concentration of the internal force here can cause cracks.

Modern tool steel practice and quality control involves comprehensive inspection. Ultrasonic inspection added to the prevailing standards enables tool steel manufacturers to market a sounder product than previously.

In conclusion, the importance of suitable heat treatment and proper design cannot be overestimated. There is no point in using a sound tool steel of optimum characteristics if the valuable properties are lost by poor heat treating practice or bad design.

Lane Wells carries on-the-job service to the nation's oil fields with this White Super Powered rig. It is one of a fleet recently equipped by Lane Wells for "combination hoist" duty—lowering and raising "down hole" instruments for radioactivity logging of the well or for gun perforating the casing in order to reach new sources of oil.



Keep the Heat Inside Your Building

SOME building owners are losing money through heat losses from insulation faults which, if eliminated, can bring substantial returns on comparatively small investments. The Magnesia Insulation Manufacturers Association offers the following quiz to check on the efficiency of your insulation methods and materials.

Each "yes" answer rates ten points. "No" answers are zero. A score of 90-100 indicates a well insulated system; a score of 80-90 indicates only minor improvements are required; 70-80 shows the need for some major insulation changes; any score below 70 proves the need for a thorough survey by an insulation engineer.

1. Are all major pieces of equipment and piping insulated?
2. Are flanges, fittings and valves insulated?
3. Are condensate or hot water return lines insulated?
4. Has damaged insulation been repaired or replaced?
5. If insulation has shrunk excessively, exposing bare pipe at insulation joints, has it been repaired or replaced?
6. If insulation has deteriorated so as to impair its insulating value, has it been replaced?
7. Are insulation thicknesses economical based on today's fuel costs, insulation costs, operating temperatures, hours of operation, conductivity of insulation, and rate of deterioration of insulation?
8. Have special protective finishes been applied at points where mechanical abuse, excessive moisture or other hazard to insulation is likely?
9. Have repairs been made to torn, broken or otherwise damaged finishes?
10. Have loosened tie wires or bands been tightened and corroded tie wires or bands replaced?

Fast Way to Figure Your Speed

A GOOD safety tip is offered to drivers on our highways. "You can convert your speedometer readings to feet per second," says *Green Fleet*, house organ of Miles & Sons, Merced, "by taking

half of your speedometer reading and adding the speed in miles per hour.

For example, a truck is doing 50 miles per hour. Half of that is 25. Add 50, and the total is 75. So—a truck traveling 50 miles per hour is covering 75 feet per second.

An average driver reacts to a possible accident situation in one-half second. Hence, a driver traveling 50 miles per hour has 37.5 feet to avoid an accident—provided he reacts and acts in that half-second.

Tommorow's Truck?

TOMORROW'S motor truck must be redesigned to incorporate the following features:

1. So that it can be used as either a closed or an open body, through use of a rolling roof;
2. So that it has self-sealing doors, both on side and end;
3. So that it is insulated, and equipped for protective service against either heat or cold;
4. So that it will accommodate pallets;
5. So that it can be loaded from any angle;
6. So that it is weathertight;
7. So that it is a standard unit, not only in size but also in attachments such as brakes, lights, tires, and wheel sizes. That feature is necessary so that it may be readily interchanged among carriers.

And to go with this newly-designed truck, a bin on skids must be devised to take numerous small packages weighing less than 25 lbs. each, and of assorted sizes.

These are recommendations of Harry E. Hassett, manager of the weighing and inspection bureau, Motor Truck Association of Southern California.

He is of the opinion that goods should be shipped (1) in standard-sized packages, (2) in quantities most easily handled by mechanized equipment. And every encouragement should be given to put that plan into action.

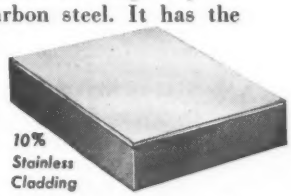
"Those who serve the cause of progress," says he, "should be encouraged by every concession to which they are entitled: those who impede it must be made to pay the costs they incur for the carrier."

Accredited Engineering Course

THE INDUSTRIAL engineering course in Oregon State College's school of engineering has been accredited by the Engineers' Council for Professional Development. Stanford and University of California were accredited last year.

Design Them Around PERMACLAD Stainless Clad Steel

Today you can improve your products and equipment and give them corrosion resistance by designing them around PERMACLAD Stainless Clad Steel. PERMACLAD is stainless steel (usually 10% or 20% but can be varied to meet design requirements) inseparably welded to mild carbon steel. It has the surface characteristics of stainless steel and the easy forming qualities of mild carbon steel. With PERMACLAD it is possible to minimize use of critical materials and, at the same time, improve your product and give it corrosion resistance where corrosion resistance is needed. New applications for PERMACLAD are constantly being discovered. It will pay you to investigate and learn if your product or equipment can be improved with PERMACLAD. Write for complete information and a free copy of folder D-74.



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One Midwest manufacturer saved $90,000 on equipment cost alone because he called in a Weld-Bilt engineer FIRST, before deciding on expensive special-design units recommended to solve a difficult handling problem. Our engineer, experienced in cost-saving shortcuts, showed how simple adaptation of more standard equipment could do the job even better.

This is the kind of service you can expect from WELD-BILT . . . a thorough analysis of your problems based on years of varied experience and wide knowledge, of handling problems . . . then a recommended solution that will do YOU the most good — in time and labor savings, in product protection, production speed-up — at the lowest cost. It may involve adapting standard equipment, custom-engineering new equipment — or merely realigning your present operations.

Call in the WELD-BILT Materials Handling Engineer for an economical solution to your problem today. You'll probably save money.

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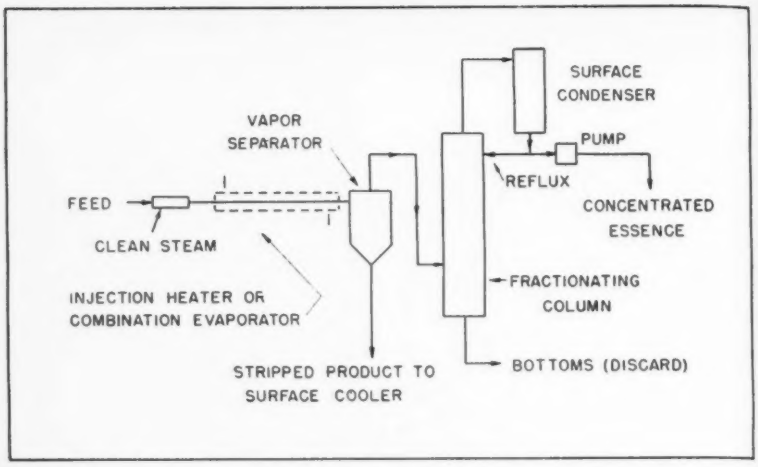

Keeping aroma in frozen apple juice was the problem. The answer was a—

New Use for Direct Steam Injection Heating

DIRECT STEAM injection heating is being used successfully by the Western Regional Research Laboratory of the U. S. Department of Agriculture in its current project to produce frozen apple juice concentrate.

In the pilot plant scale operations, apple juice is heated to 250° F., 17% of the juice is vaporized, and the juice and vapors are cooled if desired to about 80° F., all in half a second. The apple juice is also pasteurized during the treatment. The use of steam injection permits very rapid heating of the juice without the trouble from fouling of heat transfer surfaces which occurs in ordinary types of heaters.

The great value of the steam injection method of heating is that the rapidity of the process minimizes the possibility of flavor damage. While this is not highly important with apple juice, which is not especially heat sensitive, it may have wide application with other more heat-sensitive food products.

The method of preparing apple juice concentrate that has seemed best in the Western Regional Research Laboratory studies differs from that used for frozen orange juice concentrate. With oranges, the juice is concentrated six-fold by volume under vacuum at temperatures below 85°F., after which fresh orange juice is added, or "cut back," to restore the natural flavor or bouquet. The end product is a 4-to-1 concentrate. Apple juice, however, has less aroma than orange juice, and apple juice concentrates prepared at the Western Regional Laboratory by the "cut back" method were deficient in natural aroma.

Consequently, another method of restoring aroma was necessary for preparing full-flavored apple juice concentrate. The answer was to evaporate off a part of the raw juice and pass the aroma-rich vapors through a fractionating column to concentrate the aroma fraction 100-fold over the raw juice. The stripped juice is concentrated about 4-to-1 in a vacuum pan, and the juice and aroma concentrates are blended to make the full-flavored juice concentrate.

Two types of steam injection equipment may be used. The first is an injection heater which is the sole source of heat added during processing. It is suitable where vaporization is incidental to the processing operation, or where the amount of vaporization effected is not large.

Second type of equipment, designated as a "combination evaporator," is primarily a vaporizing system which incorporates the injection heater as a preheater or superheater for a single-tube steam-jacketed evaporator.

Evaporative cooling is obtained by flashing the hot liquid from the injection heater or combination evaporator into a vapor separator in which a vacuum is maintained. Only a fraction of a second is required to cool the hot fluid to a temperature corresponding to the degree of vacuum.

The apple juice product is sponsored by the Washington State Apple Commission. Its apple juice concentrate committee, headed by Reuben G. Benz of Yakima, has been endeavoring to find an outlet for C-grade (standard) apples. These are not suitable for fresh packing and shipping and heretofore had limited use in processing.

A cost of 4.6¢ per 6-fluid-ounce can is indicated, for production in a plant estimated to cost $183,000 and producing 4,000,000 cans of concentrate annually in 1,600 operating hours.

West Coast Lumber Prices Zoom

PRICES for West Coast lumber, plywood and pulp are advancing. Reports from the Pacific Northwest indicate that buying of green fir dimension and common lumber, which nose-dived in the fall, is now steady and many smaller mills are coming back into production. Although residential and commercial construction is expected to decline, anticipation of military demands will keep production at a high point.

Douglas fir plywood set an all-time production record in 1950 of 2,400 million sq. ft., about three times the peak predicted in 1935. 1950 output was valued at near a quarter billion dollars as compared with a gross of only one-tenth as much 15 years ago. An increase in production is predicted for 1951 since buying is strong and the military influence already felt. A significant trend of the past few years has been migration of the plywood industry southward as new veneer and plywood plants shift to timber in southern Oregon and northern California.

Pulp prices are high; in some areas they are approaching runaway proportions. Wood supplies are good, but a new threat to continuing high production is a shortage of sulphur. Research being made on a joint basis on solutions to this and the water pollution problem will probably mean major change in processes.

New Method for Treating Timber

INTRODUCTION of a new method of treating timber is suggested for mine owners by results of tests in California at the Forest Insect Laboratory of U. S. Department of Agriculture. The value of treated timber for mines and of the new process are features of a paper prepared by F. S. Crawford, mining engineer of California Bureau of Mines, and J. Howard Bird, chief of accident prevention and health division of California Bureau of Mines. The paper was presented at the National Safety Congress.

Although treated timber is seldom used in mines, this paper points out that untreated timber may fail prematurely in a mine as elsewhere because it may rot out before it wears out. If the wood is treated decay will be retarded and serviceable life of timber prolonged several times. Time tested methods are justified if only one replacement is saved. "In 1946 the cost of a set of 12-inch diameter timber installed in a mine in Michigan was $14.66. The cost of a set treated with chromated zinc chloride by the hot and cold bath process was $18.82. The extra $4.16 spent avoided a replacement charge of $14.66 after three years, saving $10.50."

Crawford and Bird emphasize the safety features of treated timbers in mines, pointing out that preservatives reduce danger of fire, are less apt to fail suddenly and cause accidents.

The new California method of treatment is considered especially satisfactory for mine use. This method involves injection of chemicals into the sapstream of green trees. An important advantage in this method is that with even distribution of the chemical throughout the sapwood, the part most susceptible to deterioration from rot and fungi, the effectiveness of the treatment is not seriously reduced when timber is sawed or trimmed for placement in the mine. Much mine timber thus treated may be used as received, since peeling would be unnecessary. "In fact, the bark left intact would protect against excessive personal contact with the chemical in handling timber." Zinc chloride is suggested for this timber treatment, although other preferred chemicals could be applied.

Let's get the facts STRAIGHT

about oil fog...oil mist...oil spray lubrication

Widespread acceptance of the Norgren oil fog lubrication principle for air-powered equipment has brought many imitators, naturally.

Pride in our past achievements leads us to present the following facts, so that more of industry interested in better lubrication will get the facts *straight*.

Norgren pioneered in the development of the *oil fog principle* of lubrication *more than twenty years ago*. Being first in the field, Norgren naturally had to perform all of the fundamental research and basic experimentation which was necessary. The subsequent years of development have given Norgren an immense amount of enviable knowledge and experience about *oil fog lubrication*.

On high speed spindle lubrication, Norgren also took the lead. *Fourteen years ago*, we introduced the first Norgren oil fog lubricator into this highly specialized field—and many contributing developments followed. At that time, spindle speeds of 15,000 r.p.m. were considered high. But with this Norgren aerosol lubricator sensational results in longer bearing life were produced. Thus, the Norgren spindle lubricator was directly and solely responsible for the development of present high spindle speeds of 100,000 r.p.m. and more. This Norgren *oil fog principle* is the most widely accepted method of high speed spindle lubrication today.

No . . . *oil fog* lubrication is *not new today*. It is almost as old as the Norgren organization itself. And in the twenty years since it was born in our engineering "lab," Norgren has always led the field in important developments of the *oil fog principle*. The latest evidence of this engineering leadership is our announcement of the *new and revolutionary Norgren Micro-Fog Lubricator*. Watch for it!

Norgren

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THE WEST ON ITS WAY

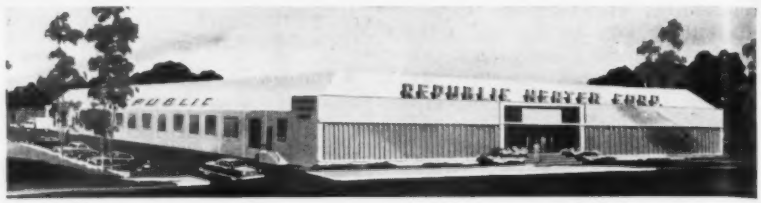
ARIZONA

ARIZONA WOOD INDUSTRY PLANS NEW PRODUCTS—Wood Oil Industries of Arizona plans to expand operations to include marketing of turpentine, pine oils, tars, resin and other related wood products. A plant to be established for this purpose will employ approximately 300 persons. Although a site has not yet been chosen, the Flagstaff area is favored.

CALIFORNIA

FIRMS AMALGAMATE FOR DEFENSE CAPITAL — Marshall Morrison, Beverly Hills designer and builder, and partner in the firm of Kuri and Morrison joins with Tri-Engineering Corporation to supply the necessary capital for a rapidly expanding program. Additional equipment will be purchased to produce precision aircraft hydraulic assemblies for the Army and Navy.

MILITARY PARACHUTES — Security Parachute Co., Oakland Municipal Airport, is converting from civilian to military production. A factory in downtown Oakland will be opened again in the near future.



Republic Heater Corp. builds new $1,000,000 manufacturing plant at Los Angeles.

NEW PLANT FOR HEATER CORP.—Construction of a new plant for the Republic Heater Corp. of Huntington Park, begins in the Los Angeles international airport industrial tract. This $1 million plant will have approximately 90,000 sq. ft. of floor space. Republic Heater Corp. manufactures gas water heaters.

CALIFORNIA FIRM REORGANIZES—Diversified Metal Products Co. is new name of Machinery Manufacturing Co., former builders of the Vernon line of jig borers, millers, shapers and tool and cutter grinders. The new company, with manufacturing facilities located at 5125 Alcoa Ave., Los Angeles, is developing several precision machine tools which are scheduled for production in February.

RIVET MANUFACTURERS MERGE—Cherry Rivet Company, Los Angeles, merges with the Pennsylvania firm of Townsend Company, rivet manufacturers since 1816. The West Coast plant will operate as the Cherry Rivet Co., division of Townsend Co. William B. Hubbard, former president of Cherry, has been elected to the Townsend Board of Directors and will be managing director of the Cherry Division.

BURLINGTON BUYS RAYON PLANT—The rayon dyeing and finishing plant of Arthur Bone, Inc., at Los Angeles, is sold to Burlington Mills Corp. for an undisclosed amount. Burlington plans to modernize the plant, double its capacity and add hosiery dyeing and finishing operations.

BETHLEHEM UNIFIES—Bethlehem Supply Co. of California is operating as an integral unit of Bethlehem Supply Company whose headquarters are at Tulsa, Okla. This move, made at the first of the year, will combine the operations of Bethlehem's oil field supply activities under one management.

HAVENSTRITE OIL SELLS PROPERTIES—Sale for $12 million of Havenstrite Oil Co.'s natural gas plant at Castaic to Union Oil Co. of California and its producing properties at Del Valle oil field to Nassau Associates, Inc., is announced. Other producing properties of the Havenstrite Co. at Long Beach, South Mountain field, and in Oklahoma, Colorado and Texas are not affected.

PACIFIC CAN TO EXPAND IN S. F.—Pacific Can Co. will expand its main plant in San Francisco in order to handle expected increased government demands. New buildings will be added in large part before seasonal demands become heavy in June. Floor space will be increased by 85,000 sq. ft. by a million dollar building program which will enable the plant to produce about 850 million cans per year.

FULTON TO BUILD MINESWEEPERS—Fulton Shipyards of Antioch is awarded contract for construction of 11 wooden minesweepers for the U. S. Navy. Each will be 165 ft. in length. The Contra Costa firm is one of five to be awarded contracts for such vessels.

GAS COMPANY APPROVES LARGE CONSTRUCTION BUDGET—San Diego Gas & Electric Co. approves a construction budget for 1951 which contemplates expenditure of $10,368,800. Largest expendi-

MAGCOA LIGHTWEIGHT MAGNESIUM

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...are flexible for greater freight-loading efficiency

Ramp and Dockboard lock together with simple pin device
Hand holds in each corner for safe, easy handling
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Beveled edges minimize jarring of load
Rounded curb ends allow greater turning radius

A combination of two sections—the ramp (with I-beam legs), and the Dockboard. Each lightweight magnesium unit can be handled safely and easily by one person. Dockboard is used as separate unit when height difference is less than fixed height of ramp. When greater height differences are encountered, the ramp and Dockboard combination is used.

Specially designed for applications where low-clearance loading equipment is used. Weighs only ¼ as much as steel ramps of equal size and strength. A modern answer to materials handling headaches in all industrial and commercial fields. Write for complete details today!

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MAGNESIUM COMPANY OF AMERICA

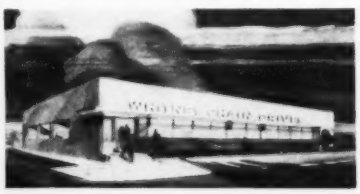
ture on any single project will be made in Silver Gate generating station for a 50,000-kw. turbo-generator. Electric transmission system expenditures are estimated at $1,302,-500, principally for a number of substations and extensions of transmission lines to serve local population increase.

FLUOR WINS AIR FORCE CONTRACT —Fluor Corp., Los Angeles, is one of three firms awarded contracts for two testing facilities of the Arnold Engineering Development Center in Tennessee. Fluor Corp.'s contract of $3,189,362 covers manufacture and installation of three test chambers, ducting and other equipment for the high altitude engine test facility.

S. C. EDISON TO EXPAND—Southern California Edison Co. allocates $60,585,000 for construction of new plant and replacements in 1951. This program is expected to provide facilities to deliver an estimated additional generation of 570 million kilowatt hours. By the end of 1951 the firm's expansion program will have involved expenditure of about $340 million over a period of six years.

AVIATION COMPANY EXPANDS—Bendix Aviation Corporation's Pacific division is transferring its development laboratory from the company's North Hollywood plant to a 50,000 sq. ft. building in Burbank. Space vacated by the laboratory staff in North Hollywood will be used for additional production space for manufacture of aircraft hydraulic parts and aircraft electronic parts. About $200,000 is being spent on new equipment to increase the plant's production capacity.

NEW WHITNEY BRANCH — Whitney Chain Company of Hartford, Conn. occupies new office and warehouse building at 5400 Pacific Blvd., Los Angeles. The modern

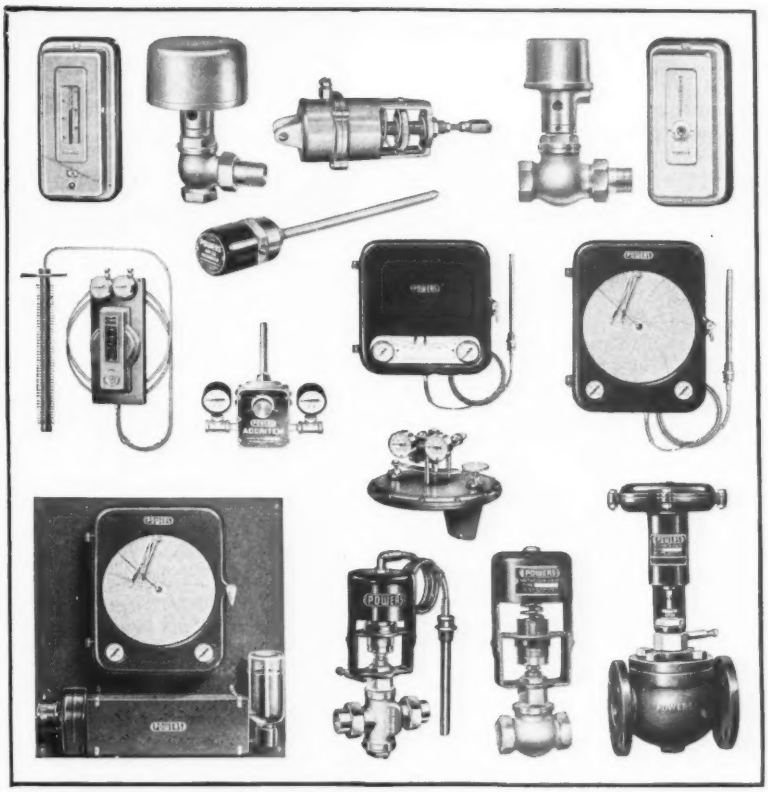


headquarters will function as engineering sales and service outlet for the complete line of Whitney power transmission and conveying chain, couplings, keys and sprockets throughout Southern California and Arizona.

SEARCH FOR MORE OIL—Standard Oil Company of California and its domestic subsidiaries plan to spend $41,500,000 during the first six months of 1951 in exploration work and oil field development to get more crude oil. If present demands continue, the company expects to spend approximately $80 million on such work in 1951, 14% more than was spent for these purposes in 1950.

NATURAL GAS PURCHASE—A group of Western industrial and investment men has been formed by William R. Staats Co. of Los Angeles to organize a new corporation for the production and development of gas properties in the Mid-Continent. Total consideration is approximately $36 million.

COLUMBIA STEEL TO BUILD—Columbia Steel Co. begins a "multi-million dollar" expansion program at its Pittsburg works. The project, which is scheduled for completion by late summer, will boost the working



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force at the plant by an estimated 800. A new four-stand cold-reduction mill, additional continuous pickling lines and annealing equipment, as well as a continuous line for production of galvanized sheets will be built.

NORTHROP GETS SCORPION ORDER —Northrop Aircraft, Inc., Los Angeles, receives letter of intent from Air Force for a substantial additional number of F-89 Scorpion all-weather interceptors. The new order will boost the company's backlog to approximately $180 million.

EXTENSIVE INDUSTRIAL COMMUNITY TO RISE—A new industrial community of major size is taking preliminary shape about the Kaiser Steel Corp. Fontana plant 60 miles east of Los Angeles. Approximately 5,000 acres of land has been assembled under option contract by the W. Ross Campbell Co. of Los Angeles, and additional land will be added. Industrial sites will be offered nationally, surrounding the West coast's first complete integrated iron and steel development, and now accommodating beside Kaiser, one spiral pipe and one rock wool insulation plant. First construction in the area beyond the $24,500,000 expansion of the Kaiser steel plant already started, will be by Southern California Edison Co. The firm has acquired 200 acres just east of the steel plant for its new $30 million steam generating station.

FOOD MACHINERY GETS TANK CONTRACT — Food Machinery & Chemical Corp., San Jose, is awarded an Army Ordnance contract to manufacture a new-type vehicle in the land tank program. Information as to the type and number of tanks was withheld, but the company will spend $42 million for tooling and will begin construction of new building to house administration and production facilities.

Plants rushed to completion at Colton, Calif., to supply plumbing fixtures.

CRANE-ALLIANCE PLANTS COMPLETED IN FEBRUARY — These two plants erected at Colton for Crane Co. and Alliance Ware, Inc., to supply pottery and porcelain enameled steel plumbing fixtures to West Coast building industries are rushed to completion by the Austin Co., to permit the start of production in February. The Crane plant will have a total of more than 150,000 sq. ft. of floor space, with provisions for increasing the area by approximately 25%. Manufacture of Alliance Ware will be concentrated in a 26,000 sq. ft. building. Crane-Pacific plant will operate on a three-shift basis employing more than 200 persons. Alliance will employ about 35 persons.

LOCKHEED LEASES MORE SPACE—Lockheed Aircraft Corp. leases 240 acres of land adjacent to the Palmdale airport from Los Angeles county. It is planned to build facilities there to cost more than $250,000 which will include a storage and maintenance hangar.

HONEYWELL PLANT PLANS ADDITIONS—Expansion of the first manufacturing operations undertaken by Minneapolis-Honeywell Regulator Company West of the Rocky Mountains is being planned in the key Los Angeles defense area during 1951. The first coast factory of M-H, producing controls for space and water heaters and employing 300 people, is located at 8775 Mettler St., Los Angeles. Preparations are now under way for additions in both engineering and production at this plant, and throughout the West.

WESTERN AUTOMOBILE EXPANSION —Chrysler Corporation will triple the size of its Los Angeles assembly plant and add

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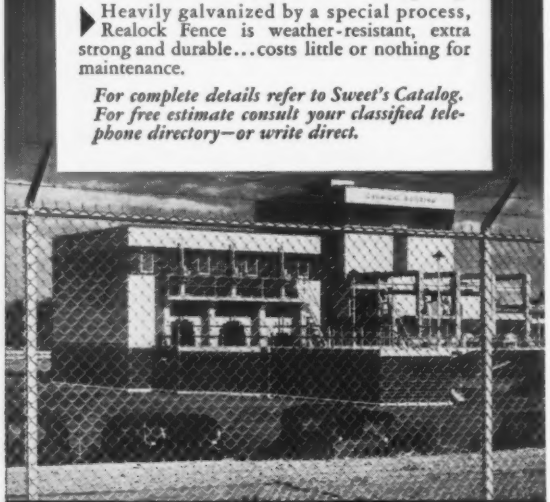
PROTECTION PLUS

▶ All fittings, hinges and locking devices have bolts *on the inside,* secure from tampering.

▶ Heavily galvanized by a special process, Realock Fence is weather-resistant, extra strong and durable...costs little or nothing for maintenance.

For complete details refer to Sweet's Catalog. For free estimate consult your classified telephone directory—or write direct.



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One lift truck and two dead skids cost about the same as *two Nutting Jacks and twelve semi-live skids.* That's one reason why the Nutting Jack and Skid system can be such a money-saver in your plant, Material stored on semi-live skids is made mobile in a hurry. The jack may be coupled to one skid, then uncoupled and coupled to another faster than the time it takes to tell about it.

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H. H. McVeigh.....West 310 First Ave., Spokane 8, Wash.
Equipment Supply Co.....60 Richards St., Salt Lake City 1, Utah
McDonald-Hunt Scale & Supply Co.....1540 Wazee St., Denver 2, Colo.
Egan W. Jones.....5th Ave. at Jackson St., Phoenix, Ariz.
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NUTTING TRUCK AND CASTER COMPANY

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1,200 new employees in 1951 in order to meet the growing demand for automobiles on the West coast. Planned expansion of facilities will enable the firm to assembly complete bodies in Los Angeles, as about 880,000 sq. ft. of factory floor area will be added.

COLORADO

CARLOADING FIRM IN DENVER—National Carloading Corporation transfers its auditing and accounting offices from New York City to Denver. J. T. Wiler, general auditor, has been transferred to Denver to take charge of the new office which has taken over the third floor of the Commonwealth Building. The move will affect about 125 employees, most of whom will be hired locally, and will add about $250,000 to the annual Denver payroll.

NORGREN STARTS NEW PLANT—Construction is in progress on a new plant of C. A. Norgren Co., Denver manufacturer of pneumatic equipment. The new structure will be built on a 3½ acre tract in Englewood, a suburb of Denver. Features of the new plant facilities will be its modern design covering more than 50,000 sq. ft. of floor space, new machine tools and materials handling equipment, high-ceiling work areas and the latest in modern lighting.

MONTANA

BIG PHOSPHATE PLANT STARTED—A $5 million phosphate processing plant, aimed at producing war-vital phosphorus, is being built near Butte by the Victor Chemical works of Chicago. The plant, now half complete, will be the second largest industry in the Butte area, surpassed only by the Anaconda Copper plant. It is being built at Silver Bow, seven miles west of Butte. The Victor firm is now opening a mine on the Maiden Rock phosphate deposit 25 miles west of Butte.

MACHINE FIRM OPENS ALUMINUM PLANT—Harvey Machine Co., Torrance, Calif., will construct an aluminum plant near Kalispell, which will produce 72,000 tons of aluminum annually. The plant will be privately financed but government assistance will be offered the Harvey company under provisions of the defense production act.

NEVADA

$22 MILLION TITANIUM PLANT NEAR—Construction of a $22 million titanium plant at Basic Magnesium plant in Henderson seems assured after the Colorado River commission granted National Lead company power for the project. Approximately 200 men will be employed by the firm with a top employment of 500 at peak production.

FLUORSPAR MILL NEAR COMPLETION—The fluorspar mill at the Baxter mine in Broken Hills, being built by H. W. Gould & Co., San Francisco mining firm, will go into operation about May 1. The mill will have a 250-ton daily capacity and will employ between 60 and 80 men to produce both metallic grades of fluorspar for use in steel-making and acid grades for use in making acids and ceramics. The Gould company recently acquired the Baxter mine property, described as the nation's largest fluorspar deposit, for $350,000.

KENNECOTT PREPARING NEW COPPER PIT—A new pit, to be known as the Kimberly Pit, will be developed in Ingersoll canyon, between Lane City and Ruth, by Kennecott Copper Corp. Engineers estimate that it will require about two years of development work before the actual ore bodies are reached, following which three to three and a half million tons of ore will be mined.

A-BOMB TESTING LOCATES AT LAS VEGAS—The Atomic Energy Commission is using a part of the 5,000 sq. mi. Las Vegas bombing and gunnery range for experiments necessary to the atomic weapons development program. Test activities at the new site include experimental nuclear detonation for the development of atomic bombs carried out under controlled conditions.

NEW MEXICO

URANIUM ORE PLANT PLANNED—J. R. Simplot, Idaho industrialist, and officials of Vitro Chemical Co. plan to convert the $5 million Kalunite plant at 600 W. 33rd South, Albuquerque, into a refinery for uranium ores. This development is expected to provide considerable stimulus to production of uranium-bearing ores in the state, particularly the recently-rejuvenated Marysvale area. Simplot bought the plant, used to manufacture alumina during World War II, from War Assets Administration in 1947, and is now turning the facility over to Vitro, of which he is vice-president. Rehabilitation of the plant will begin immediately.

OREGON

MODERNIZATION OF PULP PLANT—Three phases of modernization of the Crown Willamette Paper company mill at West Linn are currently under construction. Involved in this million dollar expansion are a new pulp bleaching plant, rebuilding of the sawmill, and expansion of the water filtering plant. Better color and grades of coated magazine-type paper will result when the new bleaching plant is integrated into the mill's paper production line, according to company officials.

EASTERNERS BUY ELGIN MILL—A group of Eastern lumber manufacturers purchase Ponderosa Pine Lumber Co. of Elgin from the Ralph L. Smith Lumber Co. The purchasing group includes Engler Millwork Corp., Jersey City, N. J.; Snell Sash & Door Co., St. Paul, Minn.; W. E. Huson & Son, New York, and Lowe & Lundberg, New York.

UMPQUA PLYWOOD STOCK SOLD—Umpqua Plywood Corp., Roseburg, sells controlling stock interest to Pritzker Co. of Chicago, Henry Gonyea of Tacoma, and W. H. Gonyea of Eugene. In addition to the plant, about 250 million ft. of timber was included in the $2 million deal. The plant manufactures about 3 million feet of plywood monthly, employing 200 people.

$3,600,000 IMPROVEMENT PLANNED FOR PULP PLANT—St. Helens Pulp & Paper Co. plans a $3,600,000 modernization and expansion program to be completed

BULK MATERIALS
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... America's GREATEST New Development for Handling Bulk Materials
the TOTE* System

The TOTE system is built around the efficient, convenient 74 cu. ft. aluminum containers known as "TOTE BINS". Combined with filling & discharging equipment, the TOTE system provides an efficient, economical and practical answer to nearly all your bulk materials handling problems. Here are just a few of the ways the TOTE system can help your operation:

***STOP* COSTLY LOSSES**
Product loss, which usually runs from ½ of 1 per cent to 3 per cent, is virtually eliminated by the smooth, rounded corners of sealed aluminum TOTE BINS. Dumping and spilling during discharge of contents are practically non-existent.

***SAVE* HANDLING COSTS**
TOTE BINS reduce labor and handling costs all along the route. A carload of TOTE BINS can be unloaded in less than one man hour—compared to the usual 8 to 14 man hours for unloading bag shipments. Storage and moving of TOTE BINS is also simpler and faster.

CUT DOWN INVENTORY
In practically every installation of TOTE system, users have found that lower on-hand inventories are possible. TOTE rids industry of the inventory bottleneck that slows shipment, hampers bookkeeping and increases handling costs.

***STEP* UP SANITATION**
TOTE BINS are practically 100 per cent sanitary. They are completely sealed after filling and during discharging. There is no danger of contamination by rodents and insects. Dust and other foreign particles cannot cling to the outside of the container to shake off into blending bins, freeing discharging rooms of dust.

***RETAIN* PRODUCT QUALITY**
Your product comes out of a TOTE BIN in exactly the same condition as it goes in, without contamination from outside sources. TOTE BINS are impervious to moisture, gases, odors, dust or other foreign material. Desirable moisture content is retained and oxidation is prevented. Bins are wire sealed against tampering.

*Both TOTE and TOTE system Reg. U. S. Pat. Off.

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within two or three years. Important items include additional chip making and screening capacity, and additional digester, a modern multi-stage pulp bleaching plant, and additional waste liquor recovery equipment. These improvements are expected to bring total daily capacity of the plant up to 225 tons against the 175 presently being produced.

UTAH

$12 MILLION REFINERY IN OPERATION—Salt Lake Refining Co., Standard Oil Co. of California subsidiary, puts in operation its newly completed $12 million houdriflow catalytic unit addition at North Salt Lake. The new addition is designed to process up to 10,000 barrels of raw material a day.

STEEL PRODUCTION INCREASE—Geneva Steel Co., subsidiary of United States Steel, will install additional facilities at the Geneva steel plant to increase its annual steel producing capacity from 1,400,000 to 1,560,000 net tons. Principal additional facilities to be provided are one open hearth steel furnace with auxiliaries, two overhead traveling cranes, one two-hole soaking pit furnace, necessary building extensions, and additional material storage facilities. It is estimated that approximately 75 more employees will be required to operate and service these additional facilities upon their completion.

URANIUM MINING—Minerals Engineering Company enters into a contract with Consolidated Uranium Mines, Inc., to undertake drilling and mechanized mining operations in the Temple Mountain mining district near Greenriver. Production of 100 tons per day is scheduled. All ore will be shipped to the new Climax Uranium processing plant at Grand Junction, Colo., for processing.

WASHINGTON

PEROXIDE PLANT TO BE BUILT—Electro-Chemical Co. of Buffalo plans to start construction at Vancouver of a $2 million plant to produce hydrogen peroxide. When in operation in about a year, the unit will employ about 150 people.

MILK CONTAINER FACTORY—A site in Vancouver is picked by Kieckhefer Container Co. upon which a 28,000 sq. ft. one-story factory building will be erected. The new installation will produce paper milk containers for Oregon, Washington, Idaho, Montana and Wyoming dairies.

NAVY CONTRACT TO BOEING—A production contract for Boeing Airplane Company's lightweight gas turbine engine is received from the U. S. Navy, Bureau of Ships. The engine will be used to supply electric power for minesweepers. Other applications of this small, general-purpose turbine are under consideration by the Navy and by the Army and Air Force.

GENERAL PETROLEUM EXPANDS—A bulk plant expansion program in excess of a quarter of a million dollars will be undertaken in Tacoma by General Petroleum Corp. This expansion program calls for substantially increasing the facilities of its Tacoma plant No. 1, at 720 East D St. Among the scheduled additions will be two 30,000 barrel floating roof type storage tanks and two 30,000 barrel cone roof tanks, providing storage space for more than 5 million gallons of gasoline and home heating fuels for the Tacoma area. General Petroleum's plant No. 2 in Tacoma, 711 Alexander Ave., has been sold to the U. S. Air Force.

KAISER HOPES TO DE-MOTHBALL VANCOUVER YARDS — Kaiser-Frazer company hopes to win government ship conversion contracts which would permit reopening of at least part of its $17 million Vancouver shipyard. The company intends to bid on the 14 to 16 new-type, high-speed cargo ships planned by the maritime commission, and has gone ahead itself with engineering work on a new type vessel, better able to elude present-day submarines.

MOSES LAKE CONCRETE PLANT—A million-dollar concrete pipe manufacturing plant on the outskirts of Moses Lake will be constructed by the United Concrete Pipe Corp. of Baldwin Park, Calif. Central part of the plant layout will be a concrete platform 1,500 ft. long and 50 ft. wide, where the pipe will be made. Equipment buildings, shop, storage and office buildings, and other facilities will surround the slab. The Moses Lake plant will serve Washington, northern Oregon, the panhandle of Idaho and western Montana.

Can't Picket to Force Joining the Union

PICKETING may be halted by injunction if the proposed contract would force all employees to join the union or lose their jobs, according to a ruling of December 14 by the Washington State Supreme Court. This ruling comes as a supplement to the same court's ruling of 1947, later supported by the United States Supreme Court, to the effect that it is illegal to picket an employer to require his employees to join a union.

In the instant case involving a dry cleaning establishment in Seattle, the teamster union had one member and were trying to force the employer to sign a contract requiring all employees to be members. All but two employees signed statements that they did not wish to join any union. The Supreme Court ordered the Superior Court to issue an injunction to stop picketing.

Lay Sewer Pipe Faster With Rubber Couplings

PROGRESS in sewer construction is indicated by a recent development which is said to permit greater speed in laying pipe as well as a tighter joint. This new flexible, mechanical rubber compression coupling is produced by Pacific Clay Products, 306 West Ave. 26, Los Angeles 31.

The usual bell and spigot are replaced on "Ceramicweld" pipe by a plain end to accommodate the rubber coupling. The coupling is said to be resistant to acid, alkali, greases and solvents in sewage. It will withstand temperatures greater than those nor-

mally found in sanitary sewers or industrial waste lines.

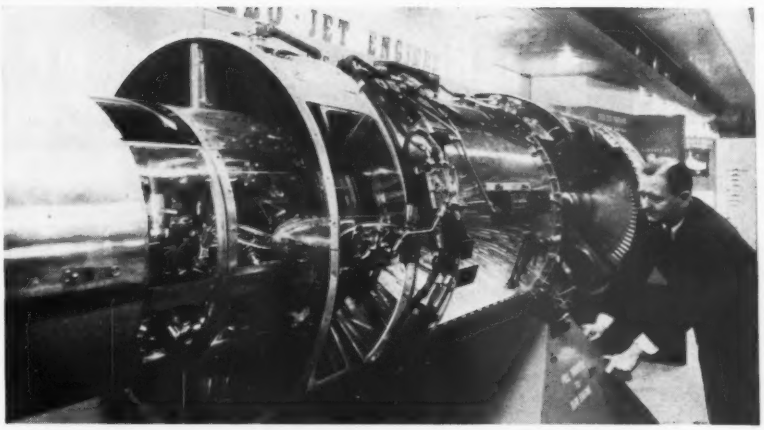
Coupling sizes produced range from 4" to 16" diameter. Steel bands inside these couplings are screwed up with a speed wrench after the pipe is laid in a trench. Result is a mechanically-compressed joint, with all parts sealed in.

After the pipe and rubber joint are in place, cement mortar is poured into the gasket, which assures a 100% tight seal, providing protection against gas, water, roots, and other substructural damage.

Special Exhibit Train For Electric Stuff

"MORE POWER to America Special," a 10-car streamlined train carrying exhibits of more than 2,000 electric products, systems and techniques for industry, will visit 15 key industrial centers in Arizona, California and Nevada during March and April, 1951.

Primary purpose of this exhibit train, sponsored by General Electric Company's Apparatus Department, is to stimulate greater American production for defense through use of electricity. The train represents an attempt to display, in one series of related exhibits, the complete range of products for producing, distributing and using electric power.



Full-size cutaway model of the J-47 turbojet engine, one of the 2,000 electric products which will be displayed in General Electric's "More Power to America" train.

Much full-size apparatus is displayed, including switchgear and substation equipment, voltage regulators, motors and welders. One of the largest exhibits of actual equipment is the record-making J-47 aircraft jet engine. Scale models or other representations are also used. Typical of these is a model of a 230-kv. impulse breaker which has transparent sections and uses varied colored lights to demonstrate how 10 million kva can be interrupted in less than five-hundredths of a second.

During each of its stops in Arizona, California and Nevada, the train will be open from 9 a. m. to 5:30 p. m. for inspection by invited representatives of industry, government, the armed forces and civic groups.

The trend is to QUALITY in lighting equipment
ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.
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This is the new low heat Ceiling-Lite designed to comply with recent Underwriters' Laboratories requirements effective January 1, 1951. Made in three sizes —
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Metzgar construction features wheels and rollers that spin on full ¼" steel balls (Hoover or equal) in the famous Metzgar Labyrinth Ball Race. Factory-lubricated for life.

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Use postage-paid card to obtain further information on products mentioned on these pages and literature listed on following pages . . .

E-201

Power Drive Belt With Teeth In It

Features claimed: The Gilmer Timing Belt is a rubber and fabric belt with teeth which fulfills the need for a power drive which will not slip and permits split-second precision timing. It will attain speeds up to 16,000 ft. per

minute, and operate more quietly than precision gears running in an oil bath. The belt is similar in appearance to a flat belt except that it has regularly spaced rubber teeth along its inner surface which engage in corresponding grooves in the pulleys. It can be manufactured in any desired size and in a variety of materials to suit specific applications. Production is now limited to specifically engineered applications, but the company expects to offer a standardized line of stock drives in both heavy and light duty constructions with a sufficient number of pulleys to give an adequate range of speed ratings.

Manufacturer: United States Rubber Co.

E-202

Lubrication By Means of Fog

Features claimed: The Micro-Fog Lubricator develops a true fog in which extremely minute and uniform size particles of lubricant remain in suspension in the air stream. Basic advantages of this new principle of airline lubrication are: fog can be carried to greater distances; it can be uniformly distributed through several outlets; effects more thorough lubrication; air flow requirement is reduced; does not require special lubricants; is fully automatic; and ends flooding of lines or equipment. Micro-Fog Lubricators are available in models to function over the complete range of 1 cfm. at 10 psi. up to 14 cfm. at 80 psi. Eight models are offered, ¼ in. and ⅜ in. pipe size, and with both sizes available in bowl capacities of ⅓ pt. and ½ pt.

Manufacturer: C. A. Norgren Co.

E-203

Expert Microfilm Photography by Amateurs

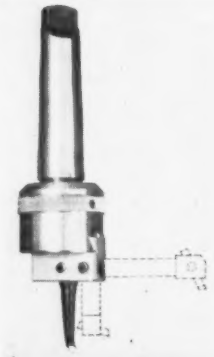
Features claimed: A person who never took a picture in his life can become an expert just by pressing a button on a new microfilm recorder recently designed. The recorder automatically takes care of lens opening and shutter speed. Lighting and film rating are perfect, so the operator need not worry about them. Key to the success of the apparatus is synchronizing the camera's shutter action with the movement of items to be photographed. This is handled by an intricate electrical system which requires a smooth flow of power. Because voltage entering the machine is subject to irregularities, a constant voltage transformer has been built into the set. Photos are taken on a 100-ft. roll of 16 mm. film. Front and back pictures of 400 checks can be taken in one minute.

Manufacturer: Sola Electric Co. and Bell & Howell Co.

E-204

Improved Boring Tool Increases Accuracy

Features claimed: Improved design of the E-Z Set boring tool facilitates set-up, increases accuracy and assures maximum ease of operation. New improvements include increased tool rigidity through incorporation of larger dovetail areas, ground fit male and female dovetail, micrometer-like adjustment which facilitates accuracy to within 0.0002 in., and elimination of distorting slots or gibs. Tools are available in three models, with maximum boring bar capacities of ½, 1, and 1½ inches. They cover a boring range of from ⅜ to 20 inches. Boring bars and socket keys are furnished as standard equipment with all models.



Manufacturer: The Maxwell Company.

E-205

Safety and Beauty for the Lady in Industry

Features claimed: A hat for women in industry that does not overlook a point in the way of safety, yet is becoming, is introduced. Known to the trade as "Ray-Ve", it is made of a washable blue taffeta which is cool and light. The hat is designed so there is no inclination to tuft the hair in front, hazardous practice with a peak-cap which is ordinarily worn on the back of the head. The snood of the Ray-ve is adjustable to take care of any amount of hair, and once adjusted to the individual, requires no further attention. Price is $13.50 a dozen net f.o.b. Detroit.

Manufacturer: Boyer-Campbell Co.

E-206

No Guessing with Industrial Scale

Features claimed: The new Dillon Weight Indicator, originally known as the Dillon Industrial Scale, is a redesigned and improved version far superior to the original. The dial diameter has been increased to 16 in., affording closer readings. Full compensation for tare loads has been provided, and a 360-deg. ball-bearing swivel hook is standard. As for accuracy, this is to within one division of the indicated reading at any point on the dial. The Indicator will weigh such materials as steel, wire, lumber, cement,

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tobacco, crates, machinery and hundreds of other items. It is especially advantageous where long or bulky objects cannot be easily moved to a central weighing point.

Manufacturer: W. C. Dillon & Co.

E-207

Efficient Transportation for "Visiting Firemen"

Features claimed: Special limousines for use by companies in meeting V.I.P.* at airports and rail terminals and transporting them to hotels, plants and factories, are being

produced for industry. These eleven-passenger, plus driver, cars have a wheelbase of 190 in., an overall length of 23 ft., and a height, over luggage rack, of only 75 in., which makes for easy loading from sidewalk. They are equipped with Mercury motors.

*Very Important People (like customers and government men).

Manufacturer: Shop of Siebert, Inc.

E-208

See All from Any Angle

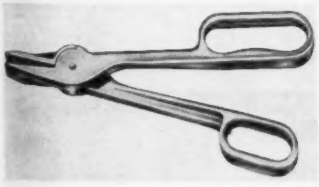
Features claimed: New Full-View type K-24 circular scale switchboard instruments feature a new concept in dial and cover structure. This provides maximum readability from steepest angles and causes no objectionable shadows on scale, even under adverse lighting conditions. Full-View design is the same as the original type K-24 except for cover and dial, and original K-24 instruments can be readily converted simply by replacing dials and covers.

Manufacturer: Westinghouse Electric Corp.

E-209

Magnesium Safety Tongs Prevent Die Damage

Features claimed: Cast from a special magnesium alloy, these new safety tongs are designed to crush, if caught within the die opening, without inflicting any damage to the die itself. They permit easy one-hand operation, allowing higher production speeds. The medium duty tongs weigh only six ounces.



Manufacturer: Magline, Inc.

E-210

A Little Powder Is a Fireman Too

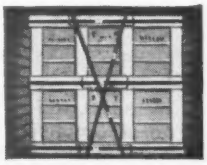
Features claimed: Ansul MET-L-X Dry Powder extinguisher is first pressurized extinguisher designed for hazardous metal fires. It is effective on fires in magnesium, sodium, potassium, zinc, powdered aluminum, etc. The extinguishing agent fuses and forms an air-excluding crust

it's a fact

Improved Shipment Protection Can Be Achieved at Lower Cost

For years, manufacturers of home appliances have paid a heavy toll in shipping damage claims. Early attempts to correct this took the form of heavy car bracing—with costs for materials alone running as high as $17 and more.

Signode field engineers, working with shippers and carriers, developed this modern method of carload bracing — a scientific combination of steel strapping and lightweight wood bulkheads.



The results are typified by this on-arrival picture of a carload of kitchen ranges. Damage—none; cash savings on materials used—$7.16; reduction in dunnage weight—115 lbs.!

it's a fact to remember!

Regardless of what, where or how you ship, the improved packaging and shipping techniques constantly being developed by Signode steel strapping specialists are worth investigating . . . today if you're engaged in **DEFENSE** or **ESSENTIAL** civilian production . . . or **TOMORROW** when the need to cut costs and increase sales may become more urgent than ever before.

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Offices coast to coast. *In Canada:* Canadian Steel Strapping Co., Ltd. Foreign subsidiaries and distributors world wide.

this seal *means security in shipping*

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HYDROSCALE

WEIGHS AS YOU LIFT THE LOAD TO MOVE IT!

A rugged, compact crane scale that makes weighing routine where it has been impractical in the past. Eliminates the need for weighing stations and tie-ups of work, men and equipment.

Speeds up shipping, receiving, inventory. Weighs, measures, tests. Prevents equipment overloading. Incorporates many features such as tare adjustment, impact resistant glass.

Available with 25° tilt dial for high level reading and with portable storage stand.

Today's outstanding crane scale. Write for catalog.

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Models 500 to 100,000 Pound Capacity

HYDROWAY SCALES, INC.

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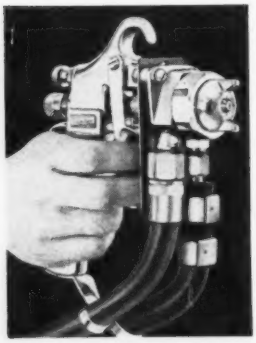
over burning metal. Without oxygen, the fire goes out. This new agent is moisture-repellent, free-flowing, non-toxic, non-corrosive and non-abrasive. It does not conduct electricity and will not deteriorate under normal conditions.

Manufacturer: Ansul Chemical Co.

E-211

Spray Painting With Superheated Steam

Features claimed: A complete line of equipment for spraying paint with steam, including a new spray gun using superheated steam instead of compressed air, allows application of heavier coats without sagging or running. The difficulties of pinholing and popping, normally caused by entrapped air, are reduced. This new process gives material savings in most applications through reduction of over-spray and atomization losses, and ability to use finishing materials higher in solids. The S-100 steam spray gun, as illustrated, was developed to meet the unusual requirements of steam spraying. New insulation and radiation design dissipate heat, enabling operator to use the gun continuously in comfort. Other features include a built-in finger guard, an adjustable fluid needle, and a spray head with one piece, easy-to-clean steam cap and fluid nozzle.



Manufacturer: American Brake Shoe Co.

E-212

Glass Tile for Wall Covering

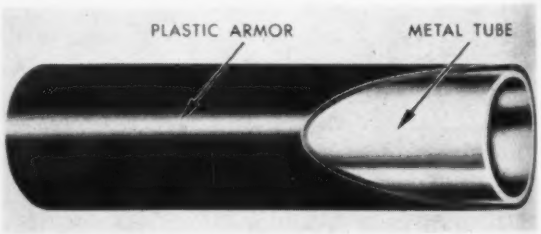
Features claimed: Le Verre Tile is a wall covering said to be different from any now on the market. It is made of a special alkali and acid resistant glass which has a color coating placed next to the wall when tile is cemented in position. Thus, color will remain unchanged indefinitely and is not subject to fading, discoloration or damage by abrasion. Le Verre Tile has been tested in bath and powder rooms, kitchens, commercial display rooms and lobbies. It comes in eight standard colors, in regular 8 x 4-in. size, and can be cut to any size or form with a glass cutter.

Manufacturer: Pittsburgh Glass Tile Company.

E-213

Plastic Overcoat for Tubing

Features claimed: A new service of extruding a coating of vinyl or polyethylene over tubing by the Dekoron process is offered plants using instrument tubing or fluid transmission lines subject to moisture or corrosive atmospheres. The thick plastic armor sheath, which can be extruded over steel, copper or aluminum, is chip-proof and renders metal tube virtually impervious to moisture, salt air, acids and alkalis, or corrosive industrial atmospheres. Dekoron tubing is made in sizes ranging from ⅛ in. OD up to 3 or more inches. Thickness of plastic armor can be varied from 15



thousandths of an inch up to practically any thickness required by service conditions.

Manufacturer: Samuel Moore & Co.

E-214

Remote Control for Any Speed-Trol

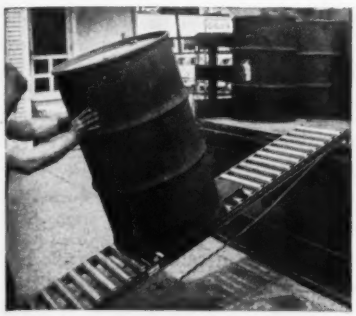
Features claimed: New mechanical remote control for Sterling speed-trol can also be adapted to any speed-trol now in use. It is available in a variety of types, such as with extended flexible cable, extended rod with universal joint, right angle bevel gear with extended rod, chain and sprocket, or a combination of any of above. This new control has been designed so that operator will always have handwheel control at his fingertips, and thus make greater use of variable speeds and maintain a steady flow of power.

Manufacturer: Sterling Electric Motors, Inc.

E-215

Why Lift It When You Can Roll It?

Features claimed: Save-A-Hoist is a gravity operated loading ramp designed to serve as standard equipment in trucks, and to reduce time and manpower required to load or unload. Load handling capacity of these units is now increased more than 25% by addition of bridge type under bracing shown. Units come in standard lengths of 10 ft. equipped with grab hooks to prevent slipping on the truck bed. Both wheel type and roller type available. Either type will accommodate medium heavy flat based objects, and when used with a board or pallet will handle bags, crates, drums or bundles with ease.



Manufacturer: Metzgar Co.

E-216

New Pump for Transferring Liquids from Barrel to Can

Features claimed: The new type barrel pump drops into drum opening and securely holds pump to drum. Fits snugly around tube and prevents foreign matter from entering drum at this point. Light liquids can quickly be transferred from drum to can.

Manufacturer: General Scientific Equipment Co.

E-217

Don't Let Static Electricity Blow Up Your Business

Features claimed: Condurock, a ready-mixed, electrically conductive floor resurfacer, was formulated during the last war to reduce explosion hazards due to static electricity. It may be applied over concrete, metal, brick, wood or

You can take these boys out of the picture with late model, modern machines. Perhaps more good can be achieved with new RACINE Metal Cutting Equipment than you realize. Cutting-off, your first operation on nearly all production jobs, may be the key to lower finished costs to you. New standards of production, accuracy and low operating cost, distinguish RACINE'S full line of Modern Power Saws. Capacities from 6" x 6" to 20" x 20". Let us give you current figures on the profit-making possibilities of these machines. We will cover general purpose, tool room and production cutting.

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composition floors. Condurock is an effective preventative against explosions caused by static electricity in laboratories and plants where black powder, igniter composition, tracer mixtures, mercury fulminate, lead azide, tetrol and like materials are handled or processed. It is packed in 30-gallon drums only, and comes with full application instructions.

Manufacturer: Rock-Tred Corporation.

E-218

How To Feed Small Parts Fast

Features claimed: Adaptable to handling many types of parts, ranging in size from tiny rivets to mower blades, the feeding capacity of Syntron Vibratory Parts Feeders can be doubled or tripled by equipping them with two or three feeding tracks instead of only one as they were originally furnished. The movement of parts is in the same direction on all tracks and discharges may be located all at one point, as illustrated, or at various points. Thus, two or more tracked Parts Feeders not only increase rate of feed, but also permit use of more processing stations, more counting devices, etc.

Manufacturer: Syntron Company.

E-219

Small But Powerful Mighty Mite

Features claimed: A new silver-cell, rechargeable battery, Model No. 5 HR, is approximately one-fourth the weight and one-third the volume of a standard lead-acid battery of the same capacity. It is spillproof and substantially leakproof, satisfactory at high altitudes, uniform in operation, needs no water or electrolyte added, and gives off no spray or corrosive fumes. This tiny battery is just 3 in. high and weighs but 4.30 oz. It can be discharged at 5 amps up to 60 minutes, and is capable of being discharged at rates up to 20 amps.

Manufacturer: Yardney Electric Corp.

E-220

Make It Hot or Make It Cold

Features claimed: Latest addition to the EMDCO line of testing equipment is the Hot-Cold Test Stand. This unit will produce any temperature between —70 deg. F. and +230 deg. F. Designed for testing small aircraft parts, the test stand has a deep well which can accommodate parts measuring up to 6- by 6- by 8-in. Item to be tested is placed in the deep well and thermal selector set at desired temperature. The part under test assumes temperature of deep well and can then be withdrawn and checked for operation.

Manufacturer: Electro Mechanical Devices.

E-221

Rubber-Covered Universal Joints

Features claimed: A molded rubber cover designed for use as a grease retainer on aircraft universal joints withstands extremely low temperatures and ozone, and is ap-

plicable for use wherever dependable operation under severe service conditions is required. The Neoprene-based rubber compound has withstood concentrations as great as 0.003% of ozone for a six-hour period. In addition, it has withstood temperatures as low as —87 deg. F., and as high as 240 deg. F. It is resistant to petroleum products and their derivatives, prolonged weathering, constant flexing, and the wear resulting from a metal-to-rubber contact.

Manufacturer: Stalwart Rubber Co.

E-222

Punch Press With More Whack

Features claimed: Several improvements are added to Benchmaster's 4-ton deep throat punch press. Open height, ram up, is now a full 8 in., permitting use of higher dies and special tooling. Press punches to the center of an 18-in. circle. Frame construction has been strengthened at all stress points and a knock-out has been added.

Manufacturer: Benchmaster Manufacturing Co.

E-223

Acid Resistant Paint Even Better

Features claimed: Chem-Rem, an acid and alkali resisting black paint, is now improved by the addition of silicone, which enhances the paint luster and provides smoother coverage with greater acid resistance. Increased water repellance is another feature. Chem-Rem is suitable for both

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TRAPS Condensation, Keeps Water and Dirt Out of Airlines. No Shutdowns While You Add Oil!

FILTER . . . VICTOR'S scientifically designed filter utilizes an oilite bronze filter unit to trap dirt, pipe scale and condensation, assuring you of pure, clean air.

REGULATOR . . . This regulator is completely newly designed for intermittent air operated tools and machinery. A newly developed seat and nozzle unit (Pat. Applied For) reduced maintenance costs to an absolute minimum.

LUBRICATOR . . . A visual sight feed lubricator that can be set instantly to any desired rate of lubrication. The lubricator is so designed that it cannot become air locked, resulting in an accurate and constant lubrication rate. The clear plastic oil cup can be removed for cleaning by hand, without tools, by merely removing the oil fill plug and the oil cup nut. There need be no interruption of air flow to machinery or tools during this operation.

MODELS

Model FLR-250 . . . . . ¼"-18NPT Inlet and Outlet (Flow Left to Right)
Model FLR-375 . . . . . ⅜"-18NPT Inlet and Outlet (Flow Left to Right)
For Right to Left Hand Inlet, Add "R" to These Model Numbers.

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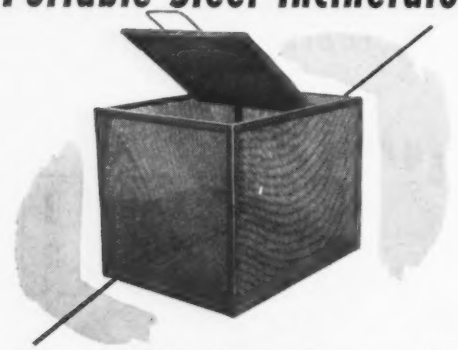
Portable Steel Incinerator



A strong, welded-steel incinerator. Fine mesh to eliminate fire hazard. Withstands rough treatment. Large door handles boxes and cartons with ease. Made without bottom for easy cleaning.

Write for complete information.

California Wire Cloth Corporation, Oakland

The Colorado Fuel and Iron Corp.
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"43 Years Service to Industry"
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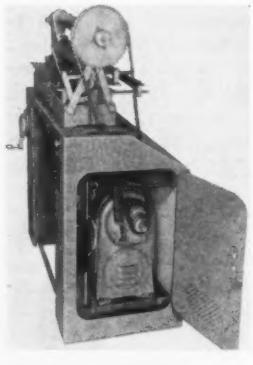
interior and exterior use on metal, masonry or wood. It withstands attacks of acetic and hydrochloric acids or dilute sulphuric acids, and protects against the severe action of bleaching solutions, dilute caustic soda, ammonia and other alkalines. Applied by brush, spray or dip.

Manufacturer: Speco, Inc.

E-224

Powershear Cuts Steel at Maximum Speeds

Features claimed: DI-ACRO Vari-O-Speed Powershear is designed and constructed to provide full capacity continuous shearing within its entire speed range of 30 rpm. to 200 rpm. Cutting cycle can be quickly adjusted to fastest speed at which operator can feed material for any given shearing operation, thereby providing maximum operator productivity, as necessity for engaging clutch for each cutting stroke has been entirely eliminated. Slow shearing speeds provide a smooth shearing action for delicate and unusual types of materials. Offered in 12 in. and 24-in. sizes with a material capacity of 16 gauge sheet metal.



Manufacturer: O'Neil-Irwin Manufacturing Co.

E-225

Add Speed to Weld Finishing

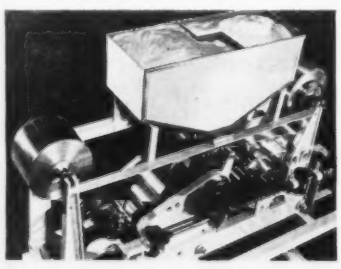
Features claimed: A completely new carbide rotary tool which finishes stainless steel welds quickly, economically and effectively is developed. The tool has a flute design which cuts in half the former finishing time and increases tool life 400 to 800 per cent. Most of the finishing problems formerly associated with stainless steel fabrication and production, particularly among food machinery manufacturers, have been eliminated.

Manufacturer: M. A. Ford Manufacturing Co.

E-226

"Soup to Nuts" Foil Packaging

Features claimed: The HECO-Packer specializes in low cost, air-tight unit packaging. Each packer is tailored to the product it packages. On unit shown a divided hopper and filling system permit simultaneous filling of two different ingredients into separate sealed compartments of the same package. Two rolls of heat-sealing aluminum foil supply packaging material. From these the packer automatically prints, forms, fills, seals and cuts off a continuous stream of complete packages at speeds up to 120 a minute. It is claimed that this machine will control accuracy on powder dosages to 1% in exact volume or weight. It will also package pastes and uniformly shaped objects, such as tablets, which can be magazine-fed.



Manufacturer: Holmes Equipment Corp.

HELPFUL LITERATURE

for the plant operator who wants to keep informed

227-L

All About California Minerals

"Mineral Commodities of California," a book prepared by the staff of the *California Division of Mines*, under the direction of Olaf P. Jenkins, chief of the division, is now ready for distribution. The volume presents the geological occurrence, economic development, and utilization of California's resources, embracing more than 80 types of raw materials of commercial and strategic importance. An attached map shows distribution of the state's mineral deposits, major rock units, and outlines of the 58 counties and land nets. The concluding section contains a directory of producers of metallic and nonmetallic minerals, mineral dealers, smelters, and commercial grinding plants within the state, and also commercial assay and testing laboratories. The publication, clothbound, 445 pages, may be purchased for $2.00 including map, or the map may be purchased separately for 50¢ from the California Division of Mines, Ferry Building, San Francisco, Calif.

228-L

A-C Car Shaker

Allis-Chalmers car shaker for unloading granular material from hopper-bottom gondola cars is described in a new bulletin available from *Allis-Chalmers Manufacturing Company*, 1088 S. 70th St., Milwaukee, Wis. Construction features of the shaker are given along with specifications and a cross section through the vibrating mechanism.

229-L

Employment in Arizona

An analysis of Arizona's population, labor force, industries, employment trends, and economic outlook is given in "The Economy of Arizona," a 41-page booklet published by the *Employment Security Commission of Arizona*, Phoenix. Although primarily intended as a study of Arizona's unemployment insurance program, the booklet contains much valuable information on the state's industries.

230-L

Better Beer

An illustrated folder, "Here are Lower Costs from Mashing to Shipping," describes how stainless steel can be used in brewery equipment to lower maintenance costs and insure long service life and freedom from metallic off-taste. Especially important are suggestions on how to get the best results and longest service from stainless steel equipment. Copies of the folder may be obtained from *Armco Steel Corporation*, Middletown, Ohio.

231-L

Thumbnail Welding Information

Containing complete specifications on close to 100 different Eutectic Low Temperature welding alloys, a new reference chart is now available without charge from *Eutectic Welding Alloys Corp.*, 40 Worth St., New York 13, N. Y. The chart is in the form of a handy 6-page folder which can be filed or bound or unfolded for wall mounting. Detailed information is given for each alloy and electrode, covering: its composition; heating facilities which can be used; metals on which to use; type and preparation of joint; preheating of parent metal, etc.

232-L

Uses for Light-Weight Pipe

A new bulletin showing typical applications of Naylor Lockseam Spiralweld Pipe in the construction, dredging, materials handling, mining, oil, paper mill, power plant, and sewage disposal fields has been released by the *Naylor Pipe Co.*, 1230 E. 92nd St., Chicago, Ill. The bulletin includes data on fittings, flanges, connections, and pipe specifications from 4 in. to 30 in. in diameter.

233-L

Controlled Atmosphere Furnace

A 4-page, illustrated catalog section descriptive of the new Series H Homocarb Furnace equipment, with Microcarb control, which continuously and automatically regulates carbon content of the Homocarb atmosphere, is available from *Leeds & Northrup Co.*, 4934 Stenton Ave., Philadelphia, Pa.

234-L

Quality Control

McGraw-Hill Book Company announces the publication of a book which describes quality control as a business method. Written by A. V. Feigenbaum, supervisor of

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COST SAME OR LESS
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training, manufacturing personnel, for General Electric, "Quality Control" is presented as an industrial management tool for improving product quality and design, and for reducing operating costs and losses. The book is priced at $7.00.

235-L

Ball Bearing Catalog

The new edition of the New Departure ball bearing catalog, now ready for distribution, contains numerous added features of interest and value to ball bearing users. Selection of bearing type and size is simplified by illustration. The catalog is available upon request from *New Departure Division, General Motors Corp.*, Bristol, Conn.

236-L

Innovations in American Industry

The 1951 edition of "New Products and Services," a compilation of more than 1,000 innovations just marketed by over 750 manufacturers, has been published by the *New York Journal of Commerce*, 63 Park Row, New York 15, N. Y. Products ranging from radioactive, "loss-proof" golf balls to hydraulic diesel-driven locomotives are fully described and cross-indexed in this 80-page compilation, priced at 50 cents per copy.

237-L

Data on Carbon, Alloy and Stainless Steel Pipe

A new data card on seamless and welded pipe of carbon, alloy and stainless steels is offered by the *Babcock & Wilcox Tube Co.*, Beaver Falls, Pa. Table I lists dimensions in 16 sizes of pipe from ⅛ in. to 8 in. nominal size, with five different weight schedules according to wall inches and inside diameter. Table II gives ASTM and ASME specifications with grades and analyses for various types of pipe for high-temperature and other services.

238-L

Precision Castings

An 8-page brochure, packed with informative data on precision castings produced by the Mercast process of frozen mercury casting, is available from the *Alloy Precision Castings Co.*, East 45th and Hamilton Ave., Cleveland 14, Ohio. Pictorial story shows the step by step production of stainless steel aircraft parts by precision castings. A graphic description of booking dies and their advantage in precision casting is included.

239-L

Wood Preservation

The 1950 issue of the annual "Proceedings of the American Wood-Preservers' Association" is now available from the office of H. L. Dawson, 839 N.W. Seventeenth St., Washington 6, D. C. A feature of the 587-page volume is a ten-year index, for the years 1940-1949. The issue gives the committee reports, contributed papers, and resultant discussion presented at the association's annual meeting. Many technical papers are included.

240-L

Incandescent Brazing of Copper Bars

A review of research in the incandescent brazing of copper bus bars is featured in the new issue of the "Bibliography of Technical Reports," now available from the Office of Technical Service of the U. S. Department of Commerce. Also included in the current issue are items on the deterioration of cast-iron pipe; offshore petroleum operations; pectin in dehydrated foods; constant-pressure combustion; structural guides for the development of synthetic lubricants; standing-wave detectors; moisture absorption of tropical woods; and rescue and survival equipment. The book may be obtained for 50 cents per copy.

241-L

High-Speed Sorting

A 4-page illustrated bulletin gives new data on the "Speed-Sort" low-range limits bridge manufactured by *Associated Research, Inc.*, 3758 W. Belmont Ave., Chicago, Ill. Speed-Sort instruments are designed for high-speed sorting of resistors or other electrical components whose resistance must be checked against all allowable ohmic tolerance.

242-L

Portable Electric Tools

Buckeye Tools Corporation, 29 W. Apple St., Dayton, Ohio, releases new catalog, featuring a complete line of 360-cycle and 180-cycle portable electric tools. Drills, screwdrivers, grinders, sanders and polishers are illustrated and described, and complete specifications on every tool are included.

243-L

Increase Broach Life

A 3-color poster chart designed for in-plant use to increase broach life, improve their service performance and help lower the cost of maintaining broaches is offered by *Colonial Broach Co.*, Box 37, Harper

All at one time...
it removes rust,
removes oil,
prepares the metal
for painting

This FREE Folder Tells About Oakite's Great New Pre-Paint Cleaner

OAKITE Compound No. 33 is a cleaning-phosphating material that simultaneously removes oil and rust and conditions the metal surface for painting.

It's a great soak cleaner for metal parts of moderate size; and great for hand-swabbing on large pieces like cabinets, desks, doors and truck cabs.

Oakite Compound No. 33 saves money, *frequently eliminates pickling operations on moderately rusty steel.*

FREE Write to Oakite Products, Inc., 1001 E. First St., Los Angeles, or 681 Market St., San Francisco, Calif., for your copy of Folder F7993 on *"Oakite Compound No. 33".*

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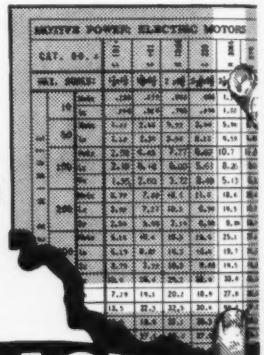
TELL YOU EXACTLY WHAT COUPLING YOU SHOULD USE!



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5092 W. Lake St. Chicago 44, Ill.
Also mfrs. Lovejoy Universal Joints and Lovejoy Variable Speed Transmissions

Station, Detroit, Mich. Entitled "Broaches Help Pay Your Wages—Take Care of Them" it lists the ten basic "never" and "always" of broach care.

244-L

Piping Centennial

An attractive, illustrated booklet, "One Hundred Years of Piping Progress," commemorating the one hundredth anniversary of the founding of *Grinnell Corporation*, Providence, R. I., has been published by the company. Interesting features include a history of Grinnell and illustrations of manufacturing, typical products, distribution, etc.

245-L

Manufacturing Know-How

Micarta gear manufacturing know-how is offered to equipment manufacturers in a new 15-page Micarta gear booklet available from *Westinghouse Electric Corporation*, Box 2099, Pittsburgh, Pa. The booklet serves three purposes: It gives an introduction to Micarta gearing; it provides machining, designing, and application information; it adds new manufacturing information to that already known.

246-L

Electric Products

A 24-page, 3-color catalog gives technical data and the standard price list of electric products manufactured by *Allied Electric Products and Sheldon Electric Co.*, 76 Coit St., Irvington, N. J. The catalog introduces many new Allied and Sheldon products, among them two new Tapmaster indestructible extension cord sets. Also described in detail for the first time is the complete line of spring-action blades and contacts available to manufacturers of extension cord sets and manufacturers of electrical products who assemble their own cord sets.

247-L

Heat Treat Bulletin

A new publication, designed to present current technical and operating information on heat treating metallurgy and practice, is instituted by *Surface Combustion Corporation*, Toledo, Ohio. "Heat Treat Review" will be published periodically and distributed to all persons concerned with heat treating operations. The magazine is intended to provide up-to-date information on heat treating processes as applied to all phases of the metal-working field.

248-L

Books for Training Apprentices

The *California State Department of Education's* Instructional Materials Laboratory has released three sets of workbooks and textbooks for the use of apprentices in the plumbing and pipefitting craft. They were written by expert journeyman plumbers and steamfitters with the advice and counsel of a State Educational Advisory Committee made up of representatives of management and labor. Additional information regarding these training books may be obtained by addressing the Department of Education, Sacramento, Calif.

249-L

"Walkie" Batteries

Gould-National Batteries, Inc., Trenton, N. J., prepares nine new battery specification sheets covering batteries used to supply power for "walkie" trucks. Each sheet details the dimensions, capacity, etc., of batteries to be used to power a specific make of "walkie".

Fewer rejections . . . greater safety . . . better employee relations . . . increased efficiency to meet defense demands—these are the immediate returns on your investment in good industrial lighting.

Appleton Industrial Lighting Equipment is precision-designed to provide *good light*—the right light, without uncomfortable glare, troublesome contrast or shadow. Expert engineering, unequalled manufacturing facilities and a half century of experience are combined in each Appleton fixture to provide maximum efficiency at minimum installation, service and operating expense.

Appleton Lighting Fixtures are made to suit every industrial requirement—including hazardous locations—whether indoors or out. For the finest illuminating equipment or expert assistance on any lighting problem, contact Appleton—Standard for Better Lighting.

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READING GUIDE FOR WESTERN MANAGEMENT

A service for all management levels . . . current literature surveyed and appraised by the faculty of the School of Management, Golden Gate College

Development of Executive Leadership

Edited by Marvin Bower, Harvard University Press, Cambridge, Mass., 1950, $2.50.

This is an important contribution to the literature dealing with the development of executive leadership. In the introduction, Dean David of the Harvard Graduate School of Business urges the development of "tough-minded humility" in young executives. He explains that tough-mindedness is an important factor in the competent handling of today's complex business problems. Humility is equally important. "It flows from a recognition of the complexities of the problems and the fact that many diverse backgrounds and talents must be brought to bear upon their solution."

This excellent book is divided into two parts: "The Kind of Business Leaders We Need," with outstanding articles by Spates of General Foods; Slichter of Harvard, and Boulware of General Electric; and "Steps in Developing the Kind of Business Leaders We Need," discussed by William Given, president of American Brake Shoe; Hall, president of the Kroger Company, and Dively of Harris-Seybold Company. All have interesting opinions and they are eminently successful executives.

Mr. Bower has done a fine job of editing, and clarifies a great deal of thinking about the needs of executive leadership.

Reviewed by:

PETER WEINBERGER
Lecturer in Human Relations.

* * *

The Scope of Modern Personnel Administration

By Thomas G. Spates, Section III, Book I, "Reading Course in Executive Technique," Funk and Wagnalls Company, New York, 1948, 71 pages.

The increasing pressure of manpower problems is directing renewed attention to personnel administration, just as labor shortages during World War II emphasized these functions of management. Training in human relations, not only for personnel department staffs, but for executives and supervisors at all levels, will be much in demand once more.

Thomas G. Spates has both the academic background as instructor and lecturer and the extensive practical experience as personnel executive to lay an adequate foundation for such training. Into 71 pages he has compressed a lifetime's thought and action in this field, giving a working outline of a highly complicated professional subject.

Carl Heyel, General Editor of Funk and Wagnalls' "Reading Course in Executive Technique," has issued 41 brief volumes. Of these, 16 volumes deal with various aspects of Personnel Administration, the other sub-headings of these sections being "Human Relations" and "Creative Training Programs." Each of the 41 booklets is written by a well-known authority on the subject.

For executives desiring to evaluate their own progress on probable future needs in Personnel Administration, Mr. Spates' volume contains an excellent "appraisal" form developed while he was in charge of personnel for General Foods Corporation.

Reviewed by:

DR. ROY W. KELLY
Lecturer in Personnel Administration.

* * *

Briefer Guides From The Management Library

Financial Reports of Labor Unions

By George Kozmetsky. Harvard University, Division of Research, Graduate School of Business Administration, Boston, 1950, $3.50.

This study of accounting and financial reporting methods of international labor unions sketches a history of union financial reporting from 1853 to serve as background for current union accounting practices. The author also explains how reports may be used by union administrators to inform members and the public of union activities.

Public Relations in the Local Community

By Louis B. Lundborg. Harper & Bros., New York, 1950, $3.00.

In this book, the Vice President of the Bank of America discusses a frequently neglected yet essential aspect of good public relations. He explains how a business organization can profit from a "good neighbor policy," and gives specific examples of how such a policy can be put into practice.

Reviewed by:

BERNA M. CARLSON
College Librarian

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WESTERNERS AT WORK

California

JOHN B. MCCANDLESS is named Southern California manager of *Ball Brothers Co.* of California. His headquarters will be in El Monte, Calif.

JOHN TROTTER, who has been production manager in charge of service departments, is now factory manager of *Cannon Electric Development Co.*, Los Angeles, in line with a new management policy. Trotter will be in charge of all manufacturing operations and all service operations. Other changes include the appointment of ED BEACHEM as superintendent of Plant II; ART BENGSTON as chief tooling, planning and methods engineer; and BOB WEBER as superintendent of Plant I.

Promotion of three California plant managers to the newly created post of operating division general manager is announced by *Douglas Aircraft company*. Named as new general managers are: ERIC SPRINGER, for the El Segundo division; FRED HERMAN, for the Long Beach division, and LEO CARTER for the Santa Monica division.

CLARENCE F. HANSEN is newly elected president of *California Research & Development Corp.*, an affiliate of Standard Oil Co. of California. He will supervise construction work in connection with the investigations which the company is carrying out at Livermore, Calif., for the Atomic Energy Commission. A. W. GLEASON becomes manager of operations at Livermore.

Former newspaperman PAUL HARRISON is *Union Pacific Railroad's* director of public relations at Los Angeles. He replaces WILLIAM ROWLAND MOORE, who has been promoted to the post of general director of public relations with headquarters in Omaha, Neb.

Durkee

J. T. DURKEE becomes comptroller of the *General Petroleum Corporation*, Los Angeles, after 31 years with the company. Since 1938 he has been assistant comptroller and assistant treasurer. GORDON D. CAMPBELL and HOWARD W. WILSON are new assistant comptrollers.

Crown Zellerbach Corporation appoints G. J. TICOULAT, Orinda, vice-president. Ticoulat has been manager of sales of Crown Willamette Paper Co. division since 1932.

A. E. MCINTYRE elected president, and WALTER TAYLOR vice-president, of *Malsbary Manufacturing Co.*, Oakland, steam cleaning equipment manufacturers. McIntyre has served as general manager since 1949. Taylor is Malsbary plant manager.

Oil Producers Agency of California elects STARK FOX vice-president. Fox has been associated with the company since 1937 and had been assistant to executive vice-president RUSH M. BLODGET.

Northrop Aircraft, Inc., consolidates all flight operations in a single department headed by E. M. OWEN, flight test expert. Owen will direct all of the company's experimental, production, special project and utility flight activities. Assisting him are W. P. THAYER, formerly chief experimental test pilot for Chance Vought, who is in charge of experimental flight test; MAX STANLEY, veteran Northrop Flying Wing test pilot, who is in charge of special projects flights; and JOHN G. FALES, formerly Lockheed test pilot, who is in charge of production flight test and utility flying.

Shell Oil Company appoints W. F. BATES general drilling superintendent. He replaces C. S. PENFIELD, who is retiring after more than 35 years with the company.

RANDOLPH SEVIER, president of *Matson Lines*, San Francisco, named to a new emergency Shipping Advisory Committee in the Federal Maritime Administration. The group

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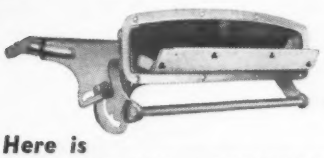

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will be charged with planning an emergency organization to handle ocean transportation such as was done during World War II by the War Shipping Administration.

ROBERT G. BAILEY becomes executive vice-president of *Pacific Tile & Porcelain company* of Los Angeles. He will continue as secretary of the firm and of Cerametal Corporation, owner of patent rights on the process used in manufacturing ceratile, a new Pacific product.

FRANK LA BELLE, formerly with Kennecott Copper Corp., Hurley, New Mexico, joins the staff of *Truesdail Laboratories*, Los Angeles, as metals chemist.

A. N. KERR, one of the fathers of the liquefied petroleum gas industry, is presented with a distinguished service life membership in the Liquefied Petroleum Gas Association. Kerr, who is president of the *Imperial Gas Co.*, Los Angeles, is the second recipient of the award given to individuals who have made an outstanding contribution to the advancement of the LP-Gas industry or of the association.

GEORGE F. GETTY, II, becomes assistant secretary-treasurer of *Pacific Western Oil Corporation* in Los Angeles. For the past 18 months he has been manager of the firm's operations in the Middle East.

D. L. MILLER is new purchasing agent at *Northrop Aircraft, Inc.*, Hawthorne. Miller has been associated with North American Aviation in various plants in the United States.

Oregon

ALFRED M. BUCHHEIT named general manager of a newly created door and sawmill division of *M and M Wood Working company*, Portland. He has been with the company for 31 years.

Washington

F. P. OWENS is new president of *Laucks Laboratories*, Seattle. Other new officers include G. O. FREEMAN, vice-president; J. E. HEFFERLINE, secretary; and B. B. WHITE, treasurer.

A. R. LINTNER, president of *American Mail Lines*, Seattle, receives appointment to a new emergency Shipping Advisory Committee in the Federal Maritime Administration. The new top advisory group will be charged with planning an emergency organization to handle ocean transportation such as was done during World War II by the War Shipping Administration.

ASSOCIATIONS ELECT

Utah Liquefied Petroleum Gas Association reelects L. M. HAINES, president, Inland Gas Co., to head the organization at its annual meeting in Salt Lake City. FRED H. LAFRENTZ, Cedar City, elected vice-president.

For the 24th consecutive time, J. C. KINNEAR, vice-president of the Kennecott Copper Corp., was elected president of the *Nevada Mine Operator's Association*.

Rocky Mountain Oil & Gas Association elects CHARLES S. HILL, Denver independent oil operator, as president. Last year Hill was vice-president of the association. Three vice-presidents were also chosen: GILBERT J. MUELLER, vice-president and general manager of the Argo Oil Company in Denver; J. P. MORONEY, Rocky Mountain district manager of the Sinclair Oil & Gas Company; and ZACH BRINKERHOFF, JR. of the Brinkerhoff Drilling Company, Casper, Wyo.

Los Angeles Personnel & Industrial Relations Association elects ROY MADSEN, personnel director of Helms Bakeries, president.

MARK BERG, Berg Metals Co., Los Angeles, elected president, Southern California chapter, *Institute of Scrap Iron & Steel Inc.*, Washington. He succeeds LOUIS L. COLEN, Nathan S. Colen & Sons, Los Angeles.

California Processors and Growers, Inc. elects O. R. HAYES, Western divisional manager for H. J. Heinz company, president. Hayes has been associated with the Heinz company for twenty-seven years and has been on the West Coast since 1943. R. G. LUCKS, vice-president in charge of the canned goods division of California Packing Corporation, reelected vice-president of the association.

OTTO H. FISCHER, president of Union Diesel Engine Company, Oakland, Calif., becomes first Westerner to head *Diesel Engine Manufacturers' Association*. One of the founders and former president of California Manufacturers Association, Fischer is also a past president of California Metal Trades Association and National Gas Engine Manufacturers Association, and a past vice-president of National Manufacturers Association.

Western Oil and Gas Association elects ROBERT L. MINCKLER, president of General Petroleum Corporation, president to succeed REESE H. TAYLOR, president of the Union Oil Company of California, who headed the association for the past two years. Other officers elected include WILLIAM REINHARDT, vice-president, Union Pacific Railroad, first vice-president; WILLIAM F. HUMPHREY, president, Tide Water Associated Oil Company, second vice-president; L. K. WHITTIER, vice-president, Belridge Oil Company, treasurer; JOHN M. PIERCE, vice-president and general manager; and D. S. KILGOUR, secretary.

AL WHITTELL, Raypak Co., El Monte, Calif., becomes president of *Radiant Heating Institute of California*. Other officers include GEORGE P. TURNER, Radiant Heat Engineering Co., vice-president; and JOHN VAN VALKENBURGH, Heatrite Corporation, secretary-treasurer.

Pacific American Steamship Association elects ROBERT E. MAYER to the office of vice-president and general manager. Mayer has been associated with West Coast shipping since 1945 as public relations director for the Pacific Maritime Association and the Pacific American Steamship Association.

FRANK C. KILPATRICK of Rockport Redwood Company is new president of the *California Redwood Association*, succeeding OTIS R. JOHNSON, president of Union Lumber Co. SHERMAN A. BISHOP elected to newly created office of executive vice-president and will continue as general manager.

ARTHUR CHAPPEL of R. D. Bodle & Co., Seattle, elected president of *Northwest Frozen Foods Association* in annual meeting at Portland. F. M. JONES, Stayton Co-op Canning Company, Stayton, Ore., named to post of vice-president and E. M. BURNS was returned to secretary-treasurer position.

Northwest Mining Association selects E. C. STEPHENS, Spokane geologist for the Anaconda Copper Mining Co., president; DAVID E. WATSON, Spokane, vice-president; WALLACE G. WOOLF, Kellogg, second vice-president; E. K. BARNES, Spokane banker, treasurer; and ROGER O. OSCARSON, Spokane mining engineer, reelected secretary.

CORYDON WAGNER, vice-president of the St. Paul & Tacoma Lumber Co., chosen 1951 president of the *National Lumber Manufacturers Association* at annual meeting in Houston, Texas.

JOHN S. RICE, Great Falls, assumes presidency of *Montana Motor Transport Association*. Other officers named are F. R. MEEHAN, Billings, vice-president; C. F. REARDON, Billings, secretary-manager; L. WAYNE HAGEMAN, Laurel, treasurer, and JACK EVANS, Billings, secretary.

BRYANT ESSICK, president of Essick Manufacturing Company, is new president of *Merchants and Manufacturers Association*.

DONALD W. DOUGLAS, president of Douglas Aircraft Company, is new chairman of *Aircraft Manufacturers Council*, Western region, of the Aircraft Industries Association. He succeeds LAMOTTE T. COHU, president of Consolidated Vultee Aircraft Corporation.

Furniture Manufacturers Association of Southern California appoints HENRY W. FULHORST general traffic manager. He will have charge of all transportation activities of the association.

WILLIAM C. MEEK, chief surveyor of the General Petroleum Corporation's Right of Way department, elected president of Los Angeles chapter of *American Right of Way Association*.

TWIN GUIDEPOSTS

Original cost is an important historical fact. The "Replacement Reserve" established and maintained by appraisal provides reconciliation of book costs and related charges with present-day realities.

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Western TRADE WINDS

News about those who distribute and sell industrial equipment and materials

San Francisco and Los Angeles offices of the *Round California Chain Co.* are now acting as sales representatives for the *Cleveland Cap Screw Co.*, producers of cap screws, socket screws, set screws and milled studs. The San Francisco office, under A. H. LUCHS, serves northern California, while the Los Angeles office, under J. D. CAVAN, covers Southern California, Arizona and New Mexico.

Crossen

Bethlehem Pacific Coast Steel Corp. appoints LAVERN CROSSEN management representative at the Seattle plant. Crossen has been with Bethlehem Pacific since 1946, and worked in the reinforcing steel department, machine shop, insurance and purchasing departments at Seattle. He succeeds T. H. SANFORD who was killed recently in a hunting accident.

Earle M. Jorgensen Co., steel distributors, assigns two Jorgensen regulars to new positions. DON ONEAL, formerly with the Oakland office, takes over as representative in the Fresno area. BILL MAGEE, who has been handling Fresno, moves to Jorgensen's Houston plant.

Oneal

Magee

Wyandotte Chemicals Corp., Pacific division, appoints J. M. NORCOTT manager of the new Pacific Industrial Chemicals department with headquarters at Los Angeles. He will handle the sale of basic chemicals.

WALTER E. BOSWELL, Los Angeles, will be West Coast representative for Purecals (precipitated calcium carbonate) for the company.

ROBERT N. KELLY named assistant to VERNE BREITENBUCHER, vice-president of sales for *M and M Wood Working Company*, Portland, Ore., makers of Malarkey plywoods and doors. For two years Kelly has been assistant district sales representative for Malarkey products in the midwest.

Kelly

Standard Electrical Tool Co., Cincinnati, Ohio, appoints the *Fred G. Littlejohn Co.*, 1350 North Highland Ave., Los Angeles, district representative. Littlejohn's territory will include Southern California and Arizona.

B. F. Goodrich Company opens new consolidated sales office and expanded master warehouse unit at 1950 Army St., San Francisco. At the open-house celebration, L. T. GREINER, Pacific Coast manager of the B. F. Goodrich replacement tire division, said expansion was necessary because the greater San Francisco area now ranks fifth among the nation's major markets for replacement tires. Goodrich divisions now operating at the Army Street address include replacement tire sales, industrial products, footwear, flooring, sundries, International B. F. Goodrich Company, automotive, aviation and government sales, and the company's Hood

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footwear sales division. Local managers of these respective divisions are W. R. DAKAN, H. B. LANE, I. H. RENNIE, W. F. MAGUIRE, J. D. CORDSEN, N. F. WEBER, C. H. KANAVEL, and V. J. REED.

Williamson

GEORGE WILLIAMSON, who has been servicing industrial accounts in the northern California area, is now associated with CARL LANG, West Coast manager of *Yale & Towne Manufacturing Co.*, with headquarters in San Francisco. While he was Western manager of Struthers-Wells Corp. and, prior to that date with Transmission Engineering Co., Williamson also represented Yale & Towne under sales of their overhead hoists and pumps. With this experience, and his knowledge of sales engineering, he is well equipped to service the industry on diversified problems of materials handling.

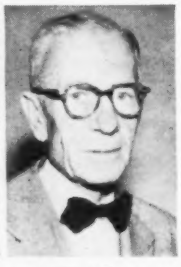
FRANK HEVESY, assistant advertising manager of Hoffman Radio Corp., Los Angeles, appointed advertising manager of *Hoffman Sales Corp.* in the same city, state distributor for the radio corporation.

Correction: A news item appearing last month stated that *"J. C. Petterson Co.*, Alhambra, Calif., manufacturers of Petco Trusscore flush doors, and Wal-Sa-Port toilet partitions, appoints *Ralph Mills & Co.*, 171 Second St., San Francisco, sales representatives." Name of the appointed firm should read *"Rolph Mills & Co."*

Fruehauf Trailer Co. appoints three division managers to direct Western sales activities of the company. E. C. HENNING, formerly sales manager and branch manager at San Francisco, will head a sales division including branches at Seattle and Spokane, Wash., Portland, Ore., and Sacramento, Oakland and

Henning

Tice



Wright

San Francisco, Calif. EARL E. WRIGHT will manage the Rocky Mountain division, including branches at Billings, Mont., Boise, Idaho, Salt Lake City, Utah, Denver, Colo., Albuquerque, New Mex., and El Paso, Tex. Wright has been manager of the company branch in Denver. A. V. TICE, whose division includes branches at Fresno, Los Angeles

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and San Diego, Calif., and Phoenix, Ariz., most recently has served as Phoenix branch manager.

Chehak

Link-Belt Speeder Corporation appoints N. V. CHEHAK district representative for Washington, Oregon, Idaho, Montana, British Columbia, and Alberta. Chehak has been at the Link-Belt factory for several years in the sales promotion department. He will make his headquarters in Portland.

Thermal Industrial Engineering Company of Denver, Colo., will represent the *Johnson Corporation* of Three Rivers, Mich., manufacturers of steam specialties and boiler room equipment. The Thermal company will represent Johnson in Colorado and Montana, eastern Wyoming, western Nebraska and Kansas, and northern New Mexico. Thermal offices are located at 1932 Cherry St., Denver.

Helipot Corporation, South Pasadena, Calif., transfers several of its sales engineering staff to traveling positions in which they will confer with clients in cooperation with local factory representatives. Among those transferred is DON H. JONES, who will cover Seattle, San Francisco, San Diego and Albuquerque, New Mex.

American Pulley Co., Philadelphia, appoints JAMES O. SMITH district representative in Los Angeles in charge of Southern California, Arizona and New Mexico. TRUMAN CLARK becomes manager of American Pulley's Seattle branch, replacing HUBERT LAWSON, retired.

Whiting Corporation opens new district sales office in Seattle, Wash., at 350 Skinner Building. R. E. FLORINE appointed district manager for the new office.

Florine

Bethlehem Supply Company and *Bethlehem Supply Company of California* become distributors of *Tube-Turn* welding fittings and flanges. G. A. TOMPSON is president and C. R. ZIMMERMAN executive vice president of Bethlehem Supply Co.; WENDELL M. JONES is vice president and general sales manager and J. W. HOLLINGSWORTH is general sales manager of Bethlehem Supply Company of California.

HARRY D. UTTER becomes division manager for northern California for *Lisle & Leif*, Western distributors for ARO Equipment Co. Utter was with Independent Pneumatic Tool Co., with headquarters in San Francisco.

Samuel W. Gibb & Co., Los Angeles, named exclusive sales representative for the industrial truck line of *Yale & Towne* material handling equipment in a territory comprising Southern California and the southwestern states. Gibb, who recently organized the Los Angeles company, was general sales manager of Yale & Towne's Philadelphia division.

McDonough Sales Agency, 3362 N. Fair Oaks Ave., Altadena, Calif., becomes sales representative in Southern California for *Ralph Chaffee & Company*, producers of heat sealing bands.

Reliance Steel Co., Los Angeles, appoints L. H. STRINGFELLOW sales manager. He has been with the company for seven years as a salesman.

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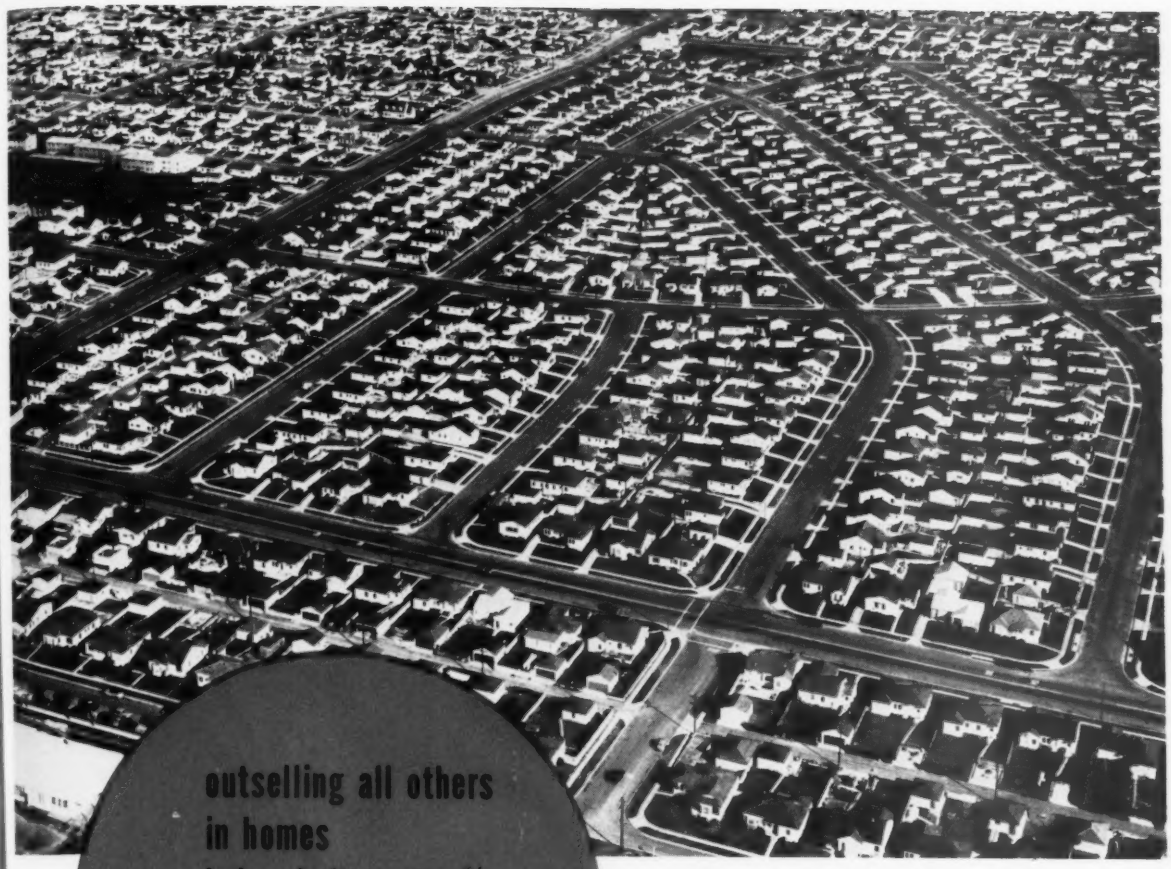

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